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No. 5

## CHANGE OF JURISDICTION.

THE AUTHORITY OF NAVY DEPARTMENT BUREAUS IN MATTERS RELATIVE TO VESSEL CONSTRUCTION IS AGAIN THE SUBJECT OF REVISION.

The protest of Rear Admiral Philip Hichborn, chief of the bureau of construction and repair, navy department, against the abolishment of general navy order No. 423, has evidently carried considerable weight with Secretary Long, as special order No. 84, just issued as a substitute for the general order, will show. Order No. 423 was issued by Secretary Herbert and gave to the chief naval constructor almost complete authority and responsibility in the designing of vessels. The friction between department bureaus, which lately drove the secretary to the point of casting about for some method that would lead to the entire abolition of the bureau system, or at least a consolidation of several of the bureaus, resulted in this order being looked upon as one of the points of special dissatisfaction, and a majority of the members of the board of construction recommended its annulment. Rear Admiral Hichborn filed a minority report, in which he made a vigorous protest against any such proceeding, and now Secretary Long has promulgated the new order. While it increases somewhat the authority of other chiefs of bureaus, so far as concerns their work on designs of ships, it reaffirms practically all of order No. 423. As other members of the board claim, however, to be well satisfied with the changes made, it is hoped that a reasonable degree of peace and harmony will prevail for some time to come. The new order makes four changes. The first occurs in the first paragraph, in which responsibility for the designs of vessels is taken from the bureau of construction and repair, leaving with that bureau the problems of structural strength and stability. The next change, which is in the fifth paragraph, limits the report of the chief constructor on any objections to certain changes "to matters under the cognizance" of his bureau. A similar change is made in paragraph six, where it is provided that proposed changes concerning more than one bureau shall be made the subject of propositions "forwarded to the department through each of the bureaus concerned." The new order is in full as follows:

S. O. 84, Navy Department.

Washington, D. C., July 24, 1899.

G. O. 423, dated Oct. 9, 1894, is amended so as to read as follows:

1. In addition to its duties as prescribed by the navy regulations, the bureau of construction and repair is charged with the responsibility for the structural strength and stability of all ships built for the navy.

2. During the preparation of the designs of a new vessel each bureau shall prepare a detailed statement of all objects under its cognizance which it is proposed to install during the construction and fitting out complete for sea, of the vessel. Fully itemized estimates of weights and positions of centers of gravity of all objects will be included in this detailed statement. A copy of the above will be furnished the bureau of construction and repair before the final plans are submitted to the secretary of the navy for his approval. Within three months after the commissioning of a new vessel a detailed statement, itemized as the above, shall be furnished the bureau of construction and repair, in which actual weights and revised estimates of positions of centers of gravity, where necessary, shall be given.

3. Changes in ships from the original designs, in the "positions, dimensions or weights of framing, hull plating, spaces, openings, or hull fittings, of machinery, armor and armament, articles of outfit or equipment, or in weight of stores to be carried, shall not be made unless approved by the department, nor shall work be commenced on a design till the space allotted for each purpose is shown on it; provided that propositions to make any of the aforesaid changes not involving a cost of more than \$500, which may be agreed upon in writing by all the bureaus concerned, need not be submitted to the department.

4. Chiefs of bureaus charged with designing, manufacturing or furnishing machinery, armor or armament, articles of outfit or equipment, or stores for vessels, who may deem it advisable to make changes in positions, dimensions or weights of said machinery, armor or armament, articles of outfit or equipment, or stores, shall submit to the department through the bureau of construction and repair a statement in writing of the proposed changes and the estimated increased or decreased weight and cost thereof, and the reasons therefor.

5. The chief constructor shall carefully consider all such proposed changes and forward them to the department with a written statement regarding their effect upon the plans, structural strength, stability and efficiency of the vessels, including in such statement an estimate of the increased or decreased cost, if any, to the bureau of construction and repair, to the result therefrom. He shall also state whether or not he finds any objections to such changes, so far as relates to matters under the cognizance of said bureau, and if so, what they are.

6. In like manner, whenever the chief of the bureau of construction and repair may deem it advisable to make changes in the construction, position or dimensions of the hull or fittings, or in space or arrangement of space, affecting the work of another bureau, he shall submit to the department, through that bureau, a statement in writing of the proposed changes and the estimated increased or decreased cost thereof and the reasons therefor. The chief of the bureau concerned shall carefully consider such proposed changes and forward them to the department with a written statement showing whether or not he finds any objections to such changes, so far as relates to matters under the cognizance of said bureau, and if so, what they are. In case such proposed changes concern more than one bureau, the chief constructor shall cause the proposition to be

forwarded to the department through each of the bureaus concerned; the chief of each of these shall make his statement upon it, as aforesaid, the last chief to whom it is referred forwarding it to the department.

7. It is not intended by this order to subordinate any one bureau to another, nor in any manner to relieve chiefs of bureaus of their responsibility in designing, manufacturing and furnishing to ships such machinery, ordnance, equipments and stores as pertain to their respective bureaus, and they will continue as heretofore to issue the necessary instructions for the carrying out of all work authorized by the department pertaining to matters coming under their cognizance, respectively.

8. The United States navy regulations are hereby amended so as to conform to the requirements of this order.

## TRIP OF THE MAE THROUGH THE ST. LAWRENCE.

Kingston, Ont., August 1.—The recent trip through the rapids of the steel steamer Mae, the largest vessel ever transferred from the great lakes to the Atlantic coast, via the St. Lawrence, has proven the most interesting event of the present season of navigation in this locality. The Mae was built by the Craig Ship Building Co. of Toledo, O., for the Porto Rico trade and is 250 feet keel, 42 feet beam and 24 feet depth. She has triple expansion engines of 19, 30 and 52 inches diameter of cylinders and 40 inches stroke; two Scotch boilers, 12 by 12½ feet, allowed 175 pounds steam pressure. As this vessel was too large to pass through the St. Lawrence canals she had to attempt the feat of running the rapids. After discharging a cargo of grain in Kingston, she proceeded under her own steam to Ogdensburg, arriving there on Sunday, July 16. From there she was taken in tow of the steamer Chieftain of the Calvin Wrecking Co., and proceeded as far as Coteau Landing, arriving there on Monday. Something having gone wrong with the Mae's steam steering apparatus, it was given a thorough overhaul and the defective part repaired, and on Tuesday the steamer, drawing 7 feet 9 inches of water, started on her perilous journey down the Coteau Rapids in tow of the Chieftain. She swept past the Coteau railway bridge without mishap. Upon taking her first plunge in the Coteau rapids, however, her steam steering gear again gave out, leaving her to the mercy of the waves, but the plucky commander of the Chieftain, realizing the danger, at once swung his steamer around in the current. He brought the Mae head to current and her anchors were thrown just below the big shoal known as "La bature de franc coeur," where she fetched up all safe in the eddy formed by this shoal. The steering gear was once more put in repair, and on Thursday the anchors were raised and another start made. Arriving opposite the great swells known as "La chute aux bouleaux" (the largest in the whole chain of rapids), the vessel took a sheer northwards, straight for the big shoal where the Standard Oil Co.'s barge stranded a year ago, but the Chieftain crowded on full steam and pulled her clear of it. The next place where trouble was expected is called "La bature a Lachine," but the steamer, as if to atone for her previous shortcomings, made this winding descent as beautifully as any of the mail steamers could have done. Split rock, Grecian's shoals and Cascades were then successively passed in safety, and without further adventure the largest and deepest draught steamship ever attempted through the rapids glided safely into the still waters of Lake St. Louis. Mr. John Craig, the builder of the Mae, was on board and expressed himself as being highly pleased with the trip.

## HARBOR IMPROVEMENTS AT TWO HARBORS AND MARQUETTE

A bulletin from the United States hydrographic office gives the following information regarding harbor works at Presque Isle, near Marquette, and at Two Harbors, Minn., both of which are points of ore shipment on Lake Superior:

The breakwater at the west side, Two Harbors, Minn., is built to the length of 750 feet, 150 feet to be added and finished in the year 1900. The breakwater at the east side of the harbor is built to the length of 750 feet. The proposed extension of 250 feet in the same direction has been abandoned and in its stead an extension at an angle of 45 degrees southward 300 feet in length is proposed, making the entire length of this (eastern) breakwater 1,050 feet. This is also to be finished in the year 1900. The least water on both sides of all the ore docks in Agate Bay, Two Harbors, is 20 feet. There is 18 feet on both sides of the merchandise dock, and the same depth on the southwest side of the coal dock.

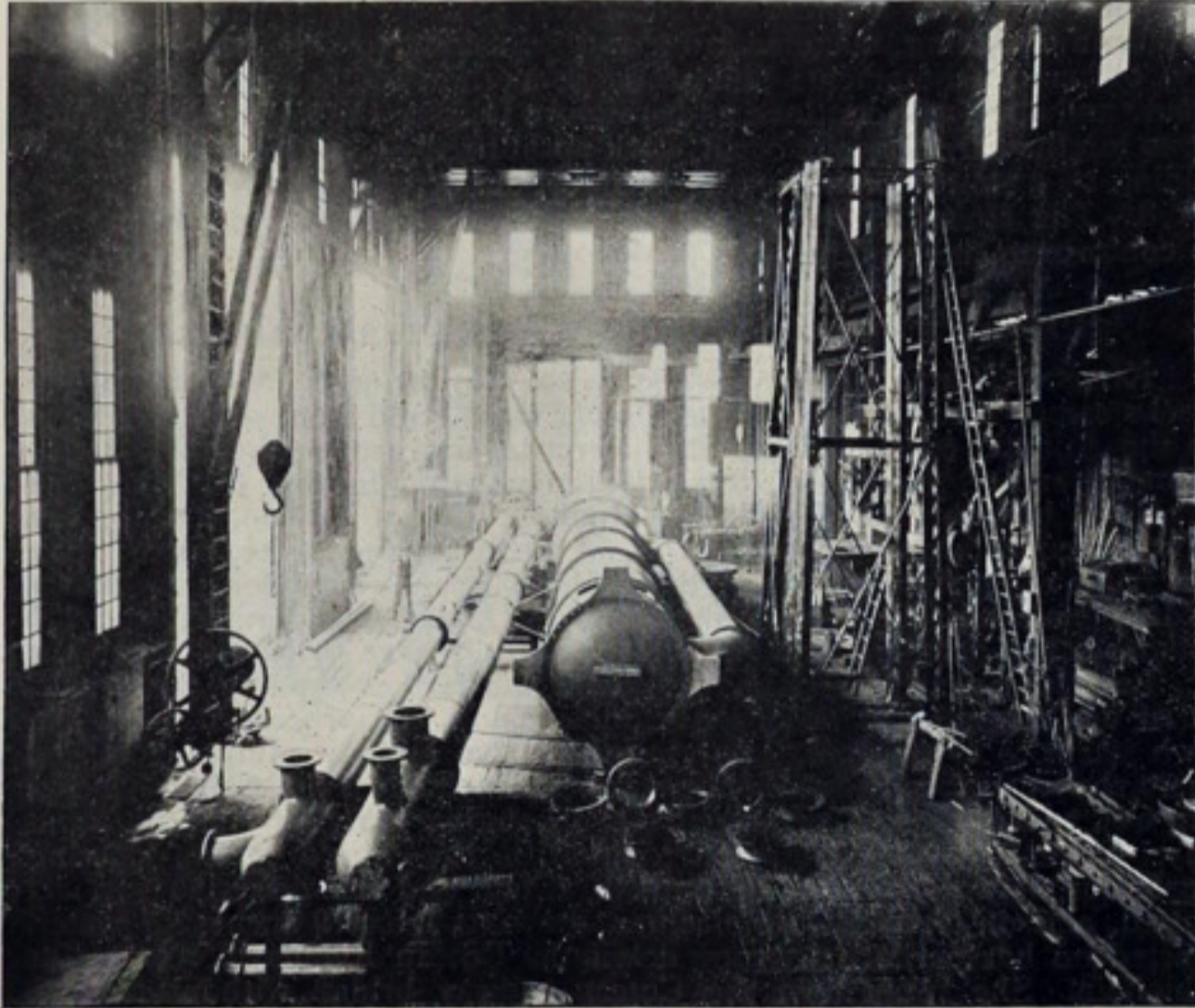
The breakwater off Presque Isle point, Marquette bay, in course of construction for the protection of the ore docks in that locality, is at present 500 feet long and is to be extended 500 feet in the same direction lakeward, the work to be finished in the year 1900. The depth of water on both sides of the ore dock of the Lake Superior & Ishpeming Ry. at Presque Isle is 20 feet, with 18 feet at the merchandise dock.

The trial of pneumatic tools, for the introduction of which on the Clyde the Chicago Pneumatic Tool Co. some time ago sent several representatives abroad, proved entirely successful, according to reports in the British engineering journals. The Syren and Shipping says: "The rivetting work was better done than by hand and more work can be turned out in the same time, although an equal number of hands is required. Whether the system will catch on with us remains to be seen. The cost of fitting out a big yard with the system would not be expensive, but then there is no person more pig-headedly Tory than the average British manufacturer; and besides, there is the British workman to consider. Will he demand that any saving secured by the introduction of the new system shall go into his own pocket? We are rather amused to find one report of the trials dwelling upon the noise the new apparatus makes."

## WORKS OF THE PUSEY &amp; JONES CO.

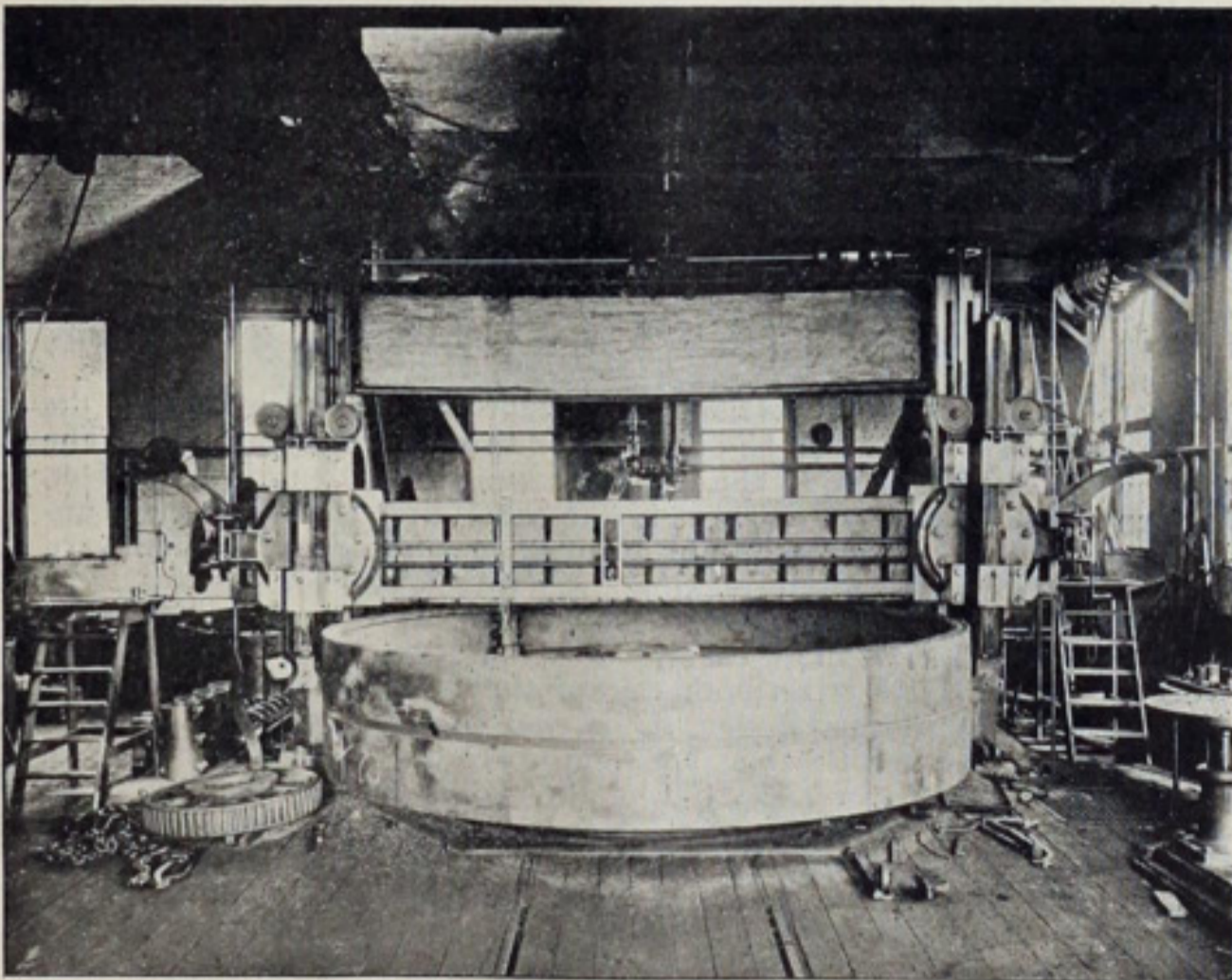
ONE OF THE OLDEST SHIP BUILDING ESTABLISHMENTS IN THE UNITED STATES  
—INTEGRITY OF REPUTATION SUPPORTED BY A GREAT VARIETY OF OUTPUT.

There are in America a number of ship building establishments more extensive than that operated at Wilmington, Del., by the Pusey & Jones Co., but there are none that have maintained a more creditable reputation than these works for integrity in the fulfillment of contracts. This reputation, extending over a full quarter of a century, has proven unique from the character of the vessels constructed—light-house tenders, revenue cutters, house boats, cup defending yachts for the international races



VIEW IN THE PUSEY &amp; JONES CO.'S BOILER SHOP.

and gunboats for South American governments. The history of this firm offers further exemplification of the growth possible from small beginnings. When Joshua L. Pusey and John Jones entered into partnership in 1848 their plant, at that time devoted to general machine construction, consisted of one shop occupying a space 40 by 75 feet, and in which ten men were employed, the weekly pay-roll rarely exceeding \$100. Various changes took place in the personnel of the firm, from time to time. In the year 1851, Edward Betts and Joseph Seal joined the original proprietors, the firm becoming, Betts, Pusey, Jones & Seal. These new partners retired in 1859, and were succeeded by Alfred Betts, and the style of the firm became Pusey, Jones & Betts. In 1860 Alfred Betts gave place to William G. Gibbons, the firm taking the name of Pusey,

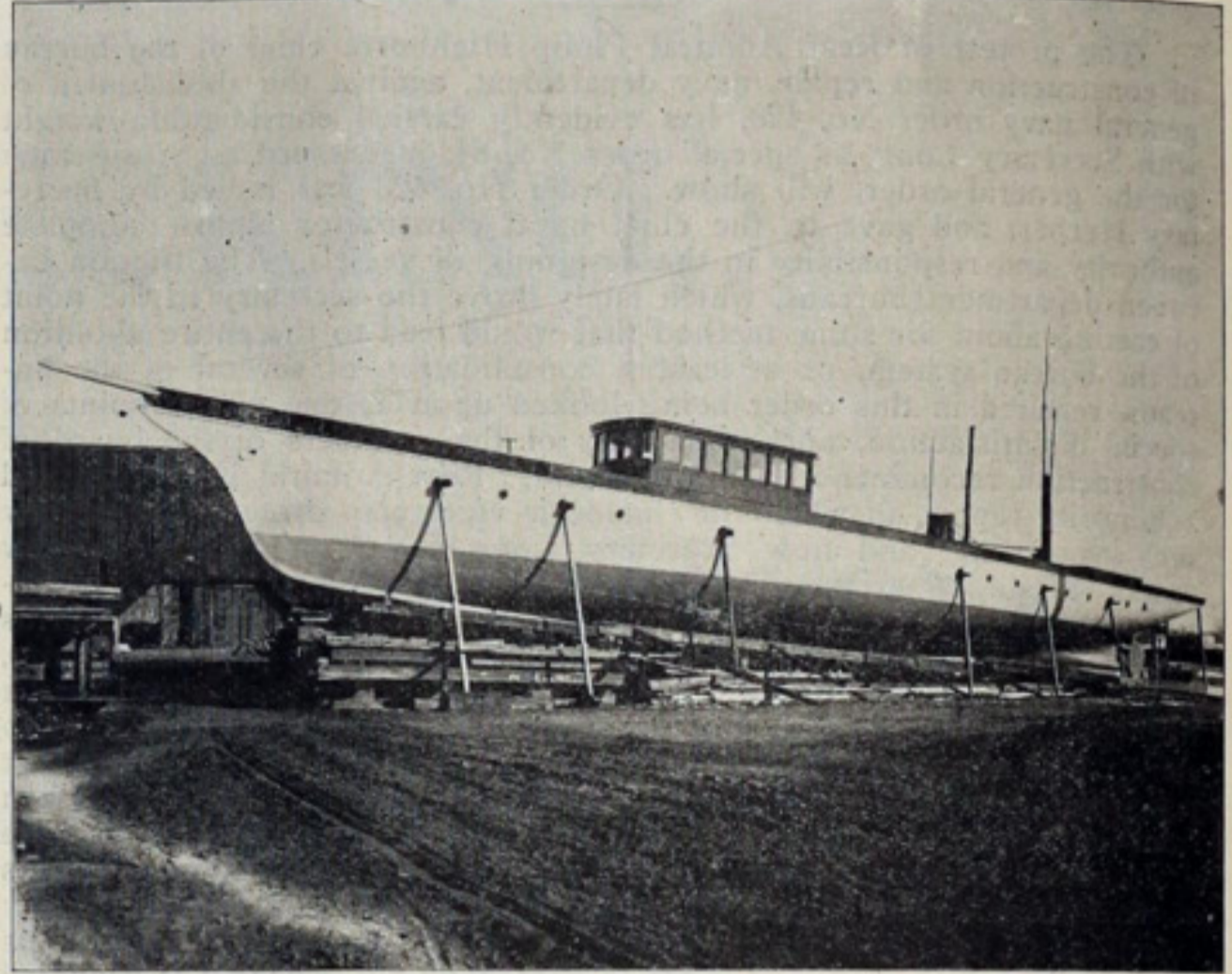


LARGE BORING MILL IN THE MACHINE SHOP.

Jones & Co. In 1866, John Jones withdrew, and Thomas H. Savery succeeded him, the firm name remaining unchanged. In 1879 the business was incorporated, by special legislative act, as the Pusey & Jones Co., the present style. Joshua L. Pusey, the originator of the business, desiring, after his long service and direction of affairs, to retire from active participation, William G. Gibbons was chosen president, upon whose death, in October, 1886, another reorganization took place, and Joshua L. Pusey was induced to take the presidency, having as his associates Thomas H. Savery, vice-president; Charles W. Pusey, general manager; William W. Pusey, treasurer; Samuel C. Biddle, secretary. The death of Joshua L. Pusey, Feb. 8, 1891, necessitated another change,

resulting in the selection of the present management: Charles W. Pusey, president; Thomas H. Savery, vice-president; William W. Pusey, treasurer; Samuel C. Biddle, secretary.

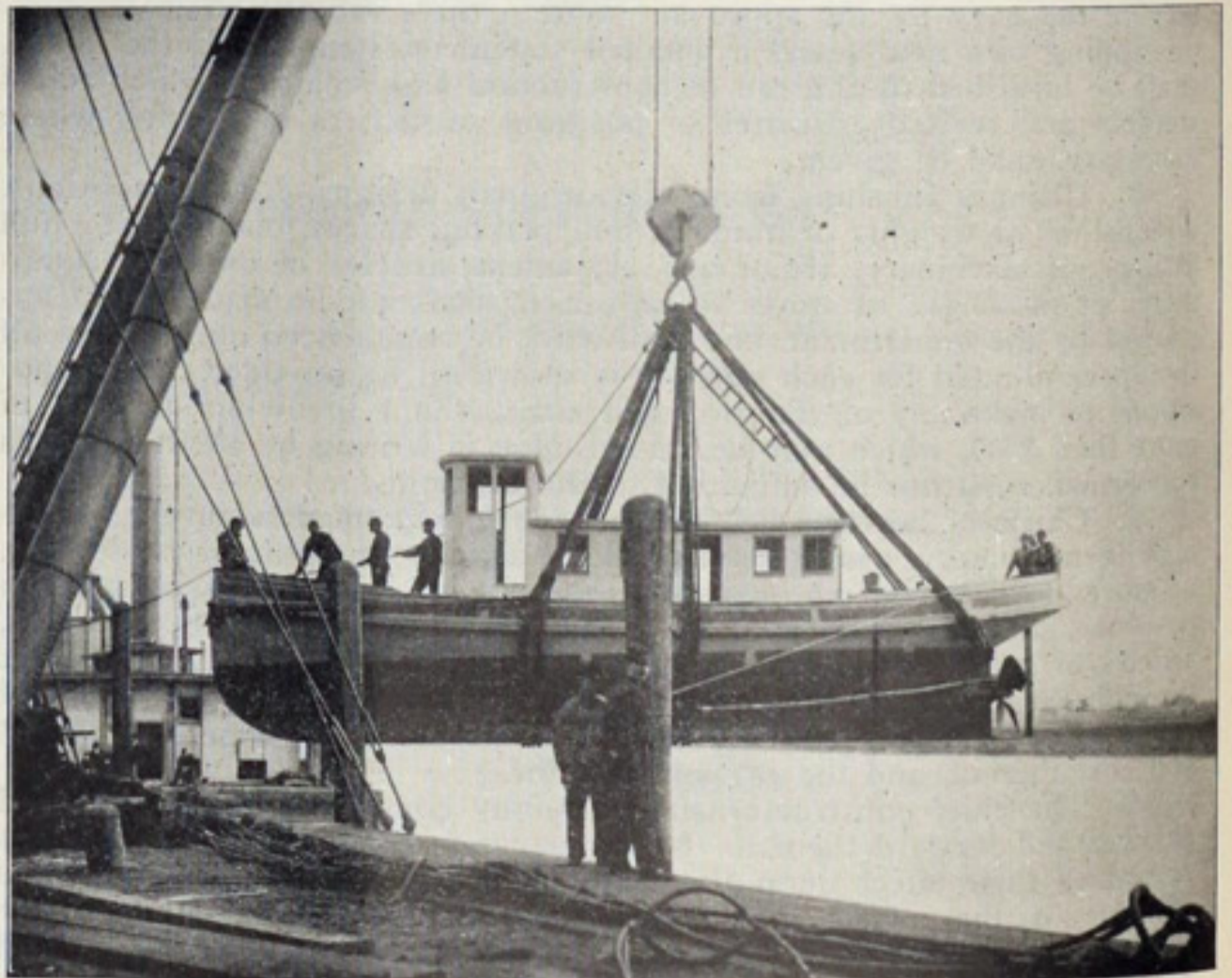
The present plant approximates seven acres and has a wharf frontage of 1,400 feet. Some idea of the facilities for ship building now provided may be gained from the floor areas embraced in the various buildings comprising the plant. These are as follows: Machine shops 43,730 square feet; boiler shop, 11,100 square feet; blacksmith shop, 8,775 square feet; tin shop, 1,693 square feet; iron foundry, 21,600 square feet; brass foundry, 3,240 square feet; joiner shop, 4,830 square feet; planing mill, 4,830 square feet; millwright shop, 2,145 square feet; mold loft, 6,075 square feet; new pattern shop, 4,400 square feet; old pattern shop, 3,000



STEAM YACHT READY FOR LAUNCHING AT PUSEY &amp; JONES YARD.

square feet; pattern storage shop, 22,000 square feet; boat yard tool shop, 10,475 square feet; frame bending shop, 5,000 square feet; general store-room, 13,400 square feet; paint, pipe and rigging shop, 1,200 square feet, and draughting room, 3,000 square feet. In addition there is a marine railway operated by steam, for hauling out vessels of medium size; and there are extensive storage lumber sheds, as well as accommodations for the storage of sand, coke, coal and other foundry supplies. The shops are all fitted with modern tools and appliances for ship building and general machine work, the equipment being either steam, air or electrically driven.

There are four sets of launching ways—one set for vessels of 300 feet in length and under, and three sets for vessels from 100 to 150 feet in length. On the main wharf there is a large four-leg lifting shears,



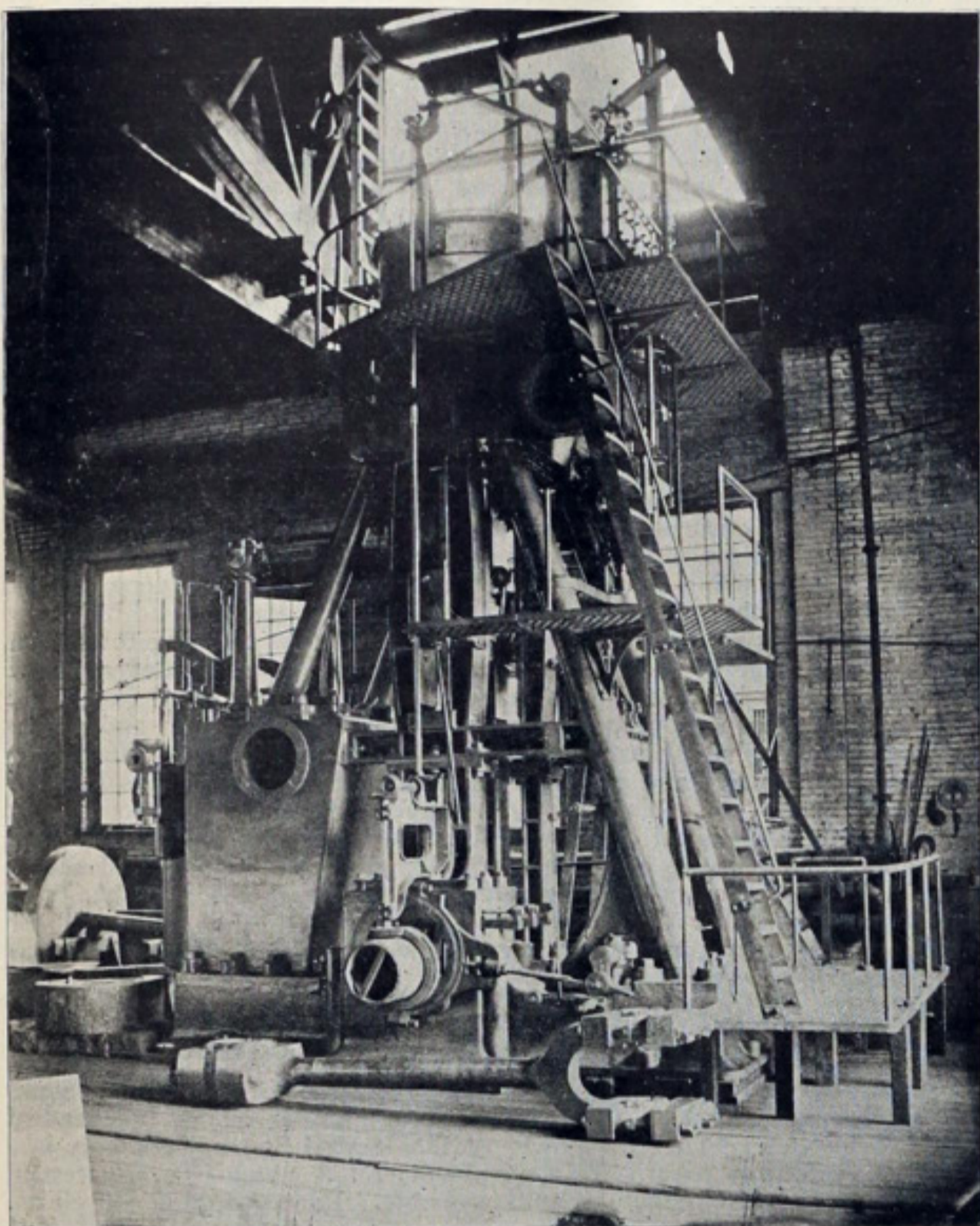
LAUNCHING BY MEANS OF LIFTING SHEARS.

constructed of the best quality plate iron and operated by steam engines. The shears is capable of lifting a boiler weighing 100 tons. The plant employs from 700 to 1,000 workmen and the pay-roll is usually in the neighborhood of \$7,000 per week.

The Pusey & Jones Co. has built since 1850 more than 300 vessels, including the various types of side-wheel, screw propeller, stern-paddle wheel and sailing craft, the range embracing pretty nearly every form of boat from the 300-foot passenger and freight steamer for ocean service to the small steam launch. It may be noted that it was at this yard, in 1854, that there was built the Mahlon Betts, the first iron sailing vessel constructed in this country. The steel yacht Volunteer, which some

years ago defended the America's cup in an international race, is another product of the plant. But, as noted above, many of the contracts executed by the company of late have been for light-house tenders and revenue cutters for the United States government and light-draught gunboats for service in the Amazon and other South American rivers.

The Pusey & Jones Co. is perhaps the only American concern that has had under construction in its yard at the same time vessels for four different governments—the United States, Brazil, Venezuela and Mexico. Many of the smaller craft designed for service in South American rivers have been shipped in three sections and re-erected at the stream which they were designed to navigate. This company has recently added laurels to those already in its possession by its achievement in delivering each of several steam yachts within a month after the time of launch.



ENGINE IN COURSE OF ERECTION IN MACHINE SHOP.

One of the handsomest of these recently constructed craft is the Illada, built for William Hester, proprietor of the Brooklyn Eagle. This yacht is 123 feet in length and distinguished by exceptionally trim lines. On a recent trial trip she more than met the expectations of both builder and owner. Another late product of the Pusey & Jones Co.'s yard recently described in the Review is the ferryboat B. M. Shanley, built for the Port Richmond & Bergen Point Ferry Co. of Port Richmond, N. Y. The Shanley is 140 feet over guards, 125 feet between perpendiculars, 52 feet beam over guards, 30 feet beam of hull and 9 feet 11 inches depth. She is fitted with a jet condensing beam engine of 30 inches cylinder diameter and 9 feet stroke. Steam is supplied from a steel return-tubular boiler, which is able to furnish 40 pounds working pressure to a 30-inch cylinder cutting off at half stroke. The vessel has steam heat, electric lights and two 18-foot metallic life boats.

#### DEVELOPMENT OF CUBAN ORE MINES.

Various rumors have lately been in circulation relative to the development of Cuban iron mines. One of the new organizations designed to further projects of this character is the Cuban Steel Ore Co. a Philadelphia enterprise, brought out by Dick Bros. & Co. of New York and Philadelphia, and which is capitalized at \$3,000,000. The company is reported to be identified with the Pennsylvania Steel Co. and the Tidewater Steel Co. It will build a dock and control a harbor in Cuba, about 60 miles west of Santiago. The company has secured control of rich iron mines in that locality, which it will develop. The preferred stock is \$1,000,000 7 per cent. cumulative preferred and \$2,000,000 common. The preferred stock will be paid for in 25 per cent. of the par value thereof on call. Each subscriber to preferred stock will be given a share of common stock as a bonus. There is \$2,500,000 in stock paid in. The officers are: Evans R. Dick, of Dick Bros. & Co., Philadelphia, president; Luther S. Bent, vice-president; Josiah Monroe, secretary and treasurer. The directors include the officers and A. W. Gibbs, George S. Graham, Isaac N. Solis, E. E. Glenn, Herman Michaelson, F. A. Baker and Robert McKinstry. The connection of the Cuban Steel Ore Co. with the Tidewater Steel Co. is that the former will sell the one to the Chester, Pa., company, where it will be manufactured. Already the Tidewater company is dredging its docks and otherwise making ready for the importation of ore from Cuba.

#### POWERFUL DREDGES.

SOME OF THE NOTABLE MACHINES RECENTLY COMPLETED OR CONTRACTED FOR ON BOTH SIDES OF THE ATLANTIC—THE MARYLAND STEEL COMPANY TO BUILD DREDGES FOR NEW YORK HARBOR IMPROVEMENT.

The last issue of the Marine Review contained a description and illustrations of one of the largest dipper dredges in the world, the Pan American, recently completed for Hingston & Woods of Buffalo, N. Y. Several other very interesting dredges of various types are now building or have recently been contracted for on both sides of the Atlantic. It has just been announced that the contract for the two hydraulic dredges designed for use in the improvement of New York harbor, and which were also fully described in a recent issue of the Review, has been let to the Maryland Steel Co. of Sparrow's Point, Md. Each of these vessels will be 320 feet in length, 48 feet beam and 26 feet depth and will be provided with fourteen hoppers with a capacity of 3,500 cubic yards. Their construction will involve an expenditure of about \$900,000.

The picture herewith presented shows the William Price hopper dredge, lately built by William Simons & Co. of Renfrew, Scotland, for the Karachi Port Trust of India. It is of the following dimensions:



WILLIAM PRICE HOPPER DREDGE, BUILT BY SIMONS & CO., RENFREW.

Length, 236 feet; beam, 42½ feet; depth of hold, 16 feet; hopper capacity, 1,250 tons. This dredge is propelled by two sets of triple expansion engines of about 1,500 horse power, and the speed, loaded, is in the neighborhood of 10 knots. The dredging is done by an endless chain of buckets working through a central well, with the usual steel-framed tower at the movable end of the dredge ladder for graduating the position of the ladder to the work to be done. The Suez Canal Co. recently placed with Simons & Co. an order for the construction of a very large and powerful hopper dredge for improving the entrance of the canal at Port Said. The vessel will be 270 feet in length, 48 feet beam, 19 feet depth and will have a hopper capacity of 2,200 tons of dredgings, while the ladder will dredge to a depth of 40 feet. Each bucket will lift 2 tons of material and the vessel will be capable of raising 1,500 tons an hour.

Among other powerful dredges recently designed are the two suction dredges which Maj. James B. Quinn, United States engineer at the mouth of the Mississippi river, will utilize in maintaining the channel at South Pass. They will cost in the neighborhood of \$150,000 each, and will be 157 feet long, 37 feet beam and 16 feet depth of hold, with two propellers and a hopper capacity of 650 cubic yards.

John Stewart & Son, Ltd., of Blackwall, England, recently completed a powerful twin-screw suction hopper dredge for the Russian government. This craft is 184 feet in length, 33 feet beam and 14 feet depth. The loading capacity of the hopper is 500 tons, and with this load the vessel draws 11 feet 11 inches and is capable of maintaining a speed of 8 knots. The propelling machinery consists of two sets of compound, surface-condensing engines of 600 horse power combined, the diameter of the cylinders being 14 and 30 inches and the stroke 22 inches. Steam is supplied at 120 pounds working pressure by two boilers, each 11 feet in diameter by 10 feet 6 inches in length.

During a recent conversation President C. B. Orcutt of the Newport News Ship Building & Dry Dock Co., said: "The ship building interests of the entire country are enjoying extraordinary prosperity. We have more work on hand at Newport News now than at any time since the plant was completed. The scarcity of material occasioned by the activity in ship building has retarded the work somewhat, but we have not made application for extension of time in the delivery of any vessel. Should the government decide to give us more time we would be pleased, as we could then make a special effort to complete the merchant vessels, several of which are badly needed for immediate service. We now have 6,000 men at work and are doing all in our power to complete the vessels under way at the earliest possible dates in all cases."

The work of fitting the United States torpedo boat Talbot with machinery for the use of liquid fuel is in progress at the Norfolk (Va.) navy yard, under the direction of F. E. Magee of the Consolidated Gas Fuel Co. of New York. Mr. Magee claims that oil will be found fully 50 per cent cheaper than coal.

## WHAT A TORPEDO BOAT IS LIKE.

DEVELOPMENT OF THE "WASP OF THE SEA"—ITS USEFULNESS IN WAR—LIFE IN ITS SCANTY QUARTERS.

BY LAWRENCE IRWELL.

It may safely be predicted that a large part of the excitement and romance of the next great naval war will be centered around torpedo boats, and there is, therefore, a general interest in the peculiarities of these "wasps of the sea." They are of comparatively recent invention. The first true torpedo boat was launched only as long ago as 1877. In that year an inventor had brought before the world, after years of anxious work and thought, the most terrible and wonderful weapon of naval warfare that had ever been produced, and in such a state of perfection that it disarmed all criticism. This weapon was the Whitehead torpedo. Several different kinds of torpedoes had been invented before this, but they were all of very crude and unwieldy pattern. The Whitehead, on the contrary, was a marvel of mechanical construction. It may be briefly described as being made of steel, about 14 feet long, with a diameter of 14 inches, and shaped like a cigar. In its nose, or pointed end, is contained the explosive; abaft this comes the air-chamber, containing the motive-power of the torpedo, namely, air compressed to a pressure of 1,000 pounds to the square inch; abaft this, again, come the engines; then the chamber containing the apparatus for regulating the depth of the torpedo in the water; and astern of all, the two propellers for driving the weapon through the water.

The torpedo is fired or thrust out from a tube on the deck of the ship or torpedo boat, and immediately it touches the water it adjusts itself to a depth of about 10 feet, and makes a bee-line for the object aimed at. If it misses the enemy, a valve opens, and it sinks, but can be recovered. If it strikes a ship, however, the charge is exploded, and tears the vessel's bottom right open, while the shock at the same time throws all her engines out of gear, and in fact cripples her completely, if it does not send her to the bottom. As far as I can ascertain, the latest development of the torpedo is a weapon some 18 inches in diameter, with a speed of 30 knots, and carrying no less than 200 pounds of gun-cotton. Although the Whitehead torpedo was quickly made part of the armament of every modern man-of-war, its advent also called into existence a class of vessel which was entirely different from anything that had been seen afloat before. It was learned that the best way of using the torpedo effectually was to fire it from a vessel of great speed and small size, so that it might be brought all the more quickly into close range with the enemy; for it must be remembered that the aim of a torpedo becomes most uncertain at a greater distance than 800 yards. It was desirable, of course, at such close quarters, that the vessel which fired the torpedo should offer as little target as possible to the enemy. The result of such a demand was the building of the type of little ships known now as torpedo boats.

I believe that the first torpedo boat ever launched was named the *Lightning*, built for the British government by Messrs. Thornycroft. Though only 90 feet long, her speed was 19 knots, and this result was considered so remarkable, with higher speeds following, that orders were given for great numbers of other boats of the same type. France, the United States, Russia and other naval powers lost no time in following suit. Since then the demand for greater length and higher speed has gone on increasing, and there seems no certainty that the limit has yet been reached. Now we have torpedo boats and torpedo boat destroyers, some of the latter credited with more than 30 knots on the measured mile.

In the British service, in which I made a brief study of torpedo boats, there are two classes of these little vessels, the second class being small and used chiefly for coast defence. The first class is intended for work at sea and for harassing an enemy's ports, and it is of a boat of this type (a small one), as well as of the life and surroundings of those on board, that the following description is given. She was "number —, first-class torpedo boat," built in 1885, and could at a push work up to a speed of about 18 knots. Although only 65 tons in weight, and 125 feet in length, her engines were of 750 horse-power, or nearly 12 horse-power to every ton, a great amount of energy to store up in such a small compass. One would imagine that to stand such a strain the boat would have to be built of very strong and rigid materials; yet she was only made of a mere skin of steel, less than a quarter of an inch thick, supported by light beams and frames of the same material. The deck, also of steel, was flush fore-and-aft, and would have made quite a fair promenade, if it had not been so overcrowded with gear and fittings. Right astern was perched "the ship's boat," a tiny dingey, large enough to carry one passenger and a crew of two men. Then comes the "quarter-deck," the only clear space along the whole length of the deck; and before this, the after "conning tower," with a torpedo tube on each side of it; further on, amidships, we find the engine-room hatchways and the funnel; and before the funnel, a machine gun, another "conning-tower" and torpedo tubes. Abaft the funnel also stood a large electric search-light projector, the light for which was supplied by a small dynamo on the lower deck. The torpedoes having been placed in the tubes, all that was necessary to force one of them into the water was an "impulse charge" of about four ounces of powder, the aiming being done by training the tube in the direction required. The fore-castle was comparatively clear, but little advantage could be derived from that fact, as once in a seaway the fore part of the boat was practically under water. It can easily be seen, therefore, that there was little room to stretch one's legs while at sea; but as a matter of fact, I believe everybody aboard had all he could do to hang on to the rails around the deck to avoid being pitched or rolled overboard.

Although the hull of the boat had only three feet of freeboard, there was much more room below than anyone would imagine by looking at her from the outside. The three officers—the captain, sub-lieutenant and gunner—had a nice little "crib," as they called it, consisting of a pantry and a comfortable little "wardroom." The upholstered locker seats on each side of the table served the purpose of a couch for the night, for of course there was no such luxury as beds or hammocks on board; and the bed-clothes were represented by a thick "duffle suit." The quarters for the crew of thirteen men in the forward part of the boat were far better

than anyone would expect. The seats and mess tables were made hinged to the wall, so that they could be turned back out of the way when not actually in use. The sleeping accommodation consisted of cork mattresses laid on the deck, with "duffle suits" to keep out the cold. Of course there were storerooms for provisions and other necessities; and taking the little boat altogether, one might easily imagine on a fine day, when everything was dry and clean, that torpedo-boat life was an easy job. So long as the sea is smooth and the weather warm, this may be fairly true, but directly the wind gives a sign of freshening, or the sea begins to get the slightest bit rough, then life on a torpedo boat becomes decidedly unpleasant. Men who have never known what sea-sickness is during years at sea get thoroughly sick with the motion and vibration. As the flying little boat cuts through the waves, a continual deluge of swirl and foam rushes over and along her deck from bow to stern. All the hatches are necessarily screwed down, and the men below have to exist on what little air gets through the ventilators. Every few seconds the boat's bow is caught by a wave, thrown up in the air high enough to take the keel out of water, and comes down with a smacking thud that almost threatens to rip her bottom right open. At times a bigger wave than the others will strike the ship, and one would imagine that she was going to be completely overwhelmed; but she manages to come up again all right, only with the disadvantage of having the sea down the funnel and the furnace fires almost out. Although the fittings of the boat are all fixed and are made to stand a lot of knocking about, it is wonderful what a pandemonium the deck below soon becomes in bad weather. The wardroom table, though screwed firmly down may be so shaken that it is wrenched from its fastenings, and ends by collapsing altogether; the little cooking range forward is not unlikely to suffer the same fate, and the cook has a fine time picking up a mixture of red-hot coals, pans, and half-cooked food; or perhaps an exceptionally heavy sea smashes the after skylight, floods the cabin, and invades everything in the place. When the sea is rough, the men in the engine room have to be very careful if they do not want to get mixed up with the machinery; but the men in the fire-room, curiously enough, are the best off in the boat; being amidships and below, they experience the least motion, and it is fortunate they do, for firing a torpedo boat under forced draft is very difficult work in bad weather.

The boat during action is steered from inside the conning tower, but at other times the deck-wheel is used, as almost any amount of spray and cold weather is preferable to being shut up. A few days' experience on a sea-going torpedo boat is enough to toughen any man; and yet, in spite of its many hardships, there is said to be no life more thoroughly liked by both officers and men of the American navy as well as by their British brethren. Its chief charm, I suppose, lies in the practical fact that it is what sailors call a "roving life," with none of the monotony of an ordinary man-of-war, but with every element of excitement and adventure. Whatever the warlike usefulness of torpedo boats may be, there can be no doubt that they are the best training ships in the world for instilling an immense amount of energy and pluck into anybody who has the making of a seaman in him.

## ISLAND POSSESSIONS MEAN SEA POWER.

Rear Admiral Francis J. Higginson, chairman of the United States light-house board, has an article in a recent number of the *Independent* in which he views "The Sea Power of the United States," not only in a way that is entirely natural for a naval officer but which is pretty certain to strike the casual reader as quite sensible. Rear Admiral Higginson says in part:

"What to the naval officer is peculiarly interesting is the fact that the present is leading the future over the sea. The sea is the 'pathway of nations,' from which for many years Uncle Sam has been conspicuous by his absence. But now it is his pathway as well as that of other nations, and the only route to his new possessions is over the sea. This brings us face to face with the greatest duty of the present time, and one which in all honor and decency we should settle ourselves and not leave to our successors. This duty is contained in the following axiom: 'To hold our island possessions the route to them must be made secure.' This in its full significance means, if it means anything, sea power. If you go to sea at all, if your business calls you over the ocean, you must go there strong enough to hold and protect your own."

Referring to the new conditions which colonial possession will impose, the rear admiral says: "This change of affairs will bring about not only the necessary material increase of the navy, but will make our duties afloat much more onerous than before." Again he says: "Yet it must not be forgotten and cannot be too often reiterated that the key to the new situation lies in the navy, and in order that the navy may perform its new functions promptly and efficiently, it is absolutely necessary that it should have access to a waterway across the isthmus and coaling stations along trade routes. In this connection it is astonishing, in view of the serious consequences involved, with what indifference and procrastination the project of the Nicaragua canal seems to be enveloped. It is of far more importance now than before we obtained our new possessions, and it is, I am convinced, the most pressing obligation which devolves upon the country today. It should have the same right of way which the Pacific railroad had immediately after the civil war, and should be pushed through to completion with the same expedition. Take, for example, the recent voyage to Manila of that mighty sea rover, the *Oregon*. She left New York Oct. 12, 1898, and arrived at Manila, March 18, 1899. The distance actually sailed by log on this voyage was 20,306 nautical miles, and this was done in 92 steaming days, or at an average speed of 220.6 knots per day. Her coal consumption, for steaming purposes alone was 5,417 tons at a cost of \$23,953.93. Had she gone by way of the Nicaragua canal she would, at the same rate of speed, have reached her destination in 51.4 steaming days on a coal consumption of 3,021 tons and at a cost of (approximately) \$6,699. While these figures are approximate they are close enough to give an idea of the relative value of the Nicaragua route. Here, then, is a clear saving in favor of the canal of first, 40.6 days in time; second, a distance of 9,983 nautical miles; third, 2,396 tons of coal; fourth, \$17,254.93. The most valuable item here is, of course, the time. How much at a critical period may happen in forty days. Whole nations have been conquered in less."

## LARGE STEAM TENDERS.

A FLEET OF FIVE EFFICIENT VESSELS UNDER CONSTRUCTION FOR THE MISSISSIPPI RIVER COMMISSION BY THE IOWA IRON WORKS OF DUBUQUE, IOWA.

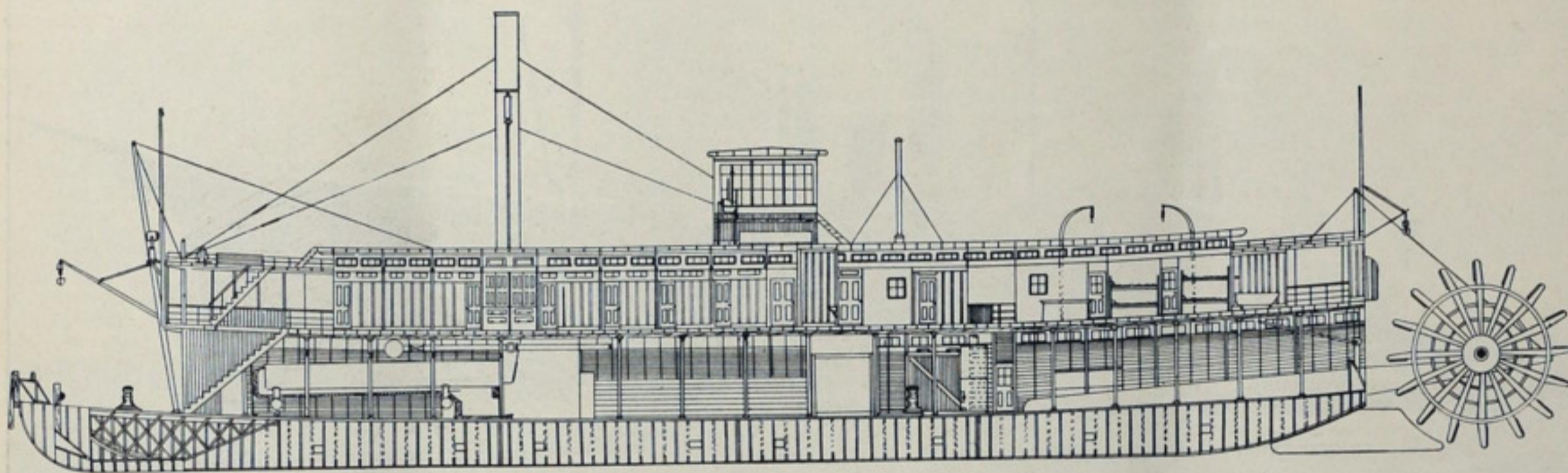
One of the most important contracts for vessel construction which has fallen to the lot of any of the builders on inland rivers for several years past is that now held by the Iowa Iron Works of Dubuque, Iowa, for the construction for the Mississippi River Commission of five large steel-hulled steam tenders, which are now well on the way to completion. These vessels are not only among the largest but among the most complete tow boats on the western rivers and will be used as tenders for the large dredges which the commission had constructed recently for the improvement of the lower Mississippi.

Dimensions of the tenders will be as follows: Length between perpendiculars, 171 feet 6 inches; length on fantails, 195 feet 6 inches; length from forward nosing over the wheel buckets, 199 feet 4 inches; beam, molded, 36 feet; width over nosings, 37 feet 8 inches; depth, molded, 5 feet 6 inches; crown of deck, 6 inches; sheer, forward, 3 feet 6 inches; sheer, aft, 2 feet 6 inches; length of fore body, 66 feet; length of after body, 45 feet 6 inches. The boats are framed on the transverse system, with six transverse bulkheads, one longitudinal bulkhead in the center and four longitudinal truss frames. The frames are spaced at the uniform distance of 18 inches apart except in one instance when the distance will be 24 inches. The frames are of 3 by 2½-inch angle bar in one piece from center bulkhead to gunwale and will be connected to the bulkhead by gussets of 7.6-pound plate, which last will stand 15 inches high by 14 inches wide and will be attached to the bulkhead by the stiffening bars on one side and by pieces of 2 by 2-inch angle bar on the other. The towing head will be built of 12¾-pound plates, flanged and riveted to each side of the stem bar and shaped to meet the nosing plates at the gunwales, and strengthened on the top edge by a 3 by 3-inch angle bar, which last will be bent around the corners of the bow and carried aft to join the gunwale angle. The forward part of the boat will be plated with 12¾-pound plate; the bilge strake or knuckle and the center or keel strake are to be of 12¾-plate throughout, and the remainder will be plated with 10.2-pound plate, except on the under side of the guard forward where the plating is to be 7.6 pounds. Seams of the keel strake will be double-riveted and all other seams single-riveted, and all butts will be

of stanchions by screw bolts. The boiler deck will be laid with yellow pine, ¾ inches thick, in strakes 3 inches wide, tongued, grooved and beaded on the under side. The height of the boiler deck from the main deck will be 11 feet 6 inches and the deck will have 4 inches of camber. The boiler deck is to be doubled over the whole of the intermediate cabin between the two passages with yellow pine ¾ inches thick in strakes 3 inches wide, slightly outgauged with cotton and payed with thick white lead. The deck house will be sided with white pine. There will be a bulkhead aft of the coal bunker and at the engine room, which will be built in substantially the same manner as the sides.

The forward cabin containing the officers' quarters, state rooms, office and mess room, will be 28 feet wide; the intermediate cabin, containing kitchen, pantry, store room, laundry, wash and bath rooms, also 28 feet wide, and the after cabin, containing the crew's mess room and quarters, 22 feet wide. The skylight will extend the full length of the cabin at a width of 14 feet. There will be a passage 4 feet wide between the forward and intermediate cabins, closed at each side by a door, so that the siding will be continuous as far as the end of the intermediate cabin. The distance between the intermediate and after cabin will be 6 feet on the starboard side and here the after stairway will land, leaving a clear gangway of 3 feet. On the port side the laundress' room will extend 3 feet into the passage way, leaving a 3-foot gangway on this side. The pilot house will be 13 feet long fore and aft, 13 feet wide and 12 feet 6 inches high. A galvanized iron water tank and filter 9 by 3 feet and 20 inches in depth will be provided for cold water service, and a tank of similar dimensions but supplied with a steam heating coil will be provided for the hot water service. Both tanks will be under the floor of the pilot house. The tanks will be supplied by the fire pump. There will be eight staterooms in the after part of the cabin, each nicely fitted up, and the entire equipment of the vessel will be thoroughly modern and up to date, including complete electric light and refrigerating plants.

Engines are of the usual Mississippi river type and built with ample strength for working under a steam pressure of 200 pounds per square inch. Special attention has been given to reducing weights as much as possible. The engines are therefore of simple design, large wearing surfaces, balanced valves and variable cut-offs. The cylinders, which will be fastened to the beams without cast iron bed plates, will be of 22 inches diameter and 8 feet stroke. The engines will be handled from throttle valve stand in the usual manner. The reversing and cut-off shafts and levers will be below the deck and a steam reversing cylinder will be pro-



OUTBOARD PLAN OF FIVE TOWBOATS BUILDING FOR THE MISSISSIPPI RIVER COMMISSION BY THE IOWA IRON WORKS, DUBUQUE, IA.

double-riveted. The plating will be fifteen strakes laid alternately inside and outside, the keel strake being an inside strake. The width of the bottom strakes on dead level will be 36 inches, center to center of laps, and the ruling length of plates will be 18 feet. In the deck plating there will be thirteen strakes each 36 inches wide, center to center of laps, except the plate sheer which must be of the requisite width to come flush with gunwale angle. The center strake and plate sheer will be of 12¾-pound plate but all the remainder will be of 10.2-pound plate. The cylinder beams are to be built in the form of a box girder. The two rudder boxes will be built of 10.2-pound plate, and the boxes will, of course, be made water tight below deck. The two balanced rudders will each be placed at a distance of 9 feet 6 inches from the center line of the boat. All the plates and angles used in the work of construction are to be of soft steel having an ultimate tensile strength of from 52,000 to 62,000 pounds per square inch, the elastic limit being not less than half the ultimate strength, with an elongation of 26 per centum in 8 inches and a minimum reduction of area at fracture of 50 per cent. The bottom of the hull of each vessel is tested for watertightness by filling with water to a depth of about 6 inches before the boat is launched.

The forward end of the boiler deck house will be about 21 feet 3 inches from the bow. The side bulkheads have a width of 28 feet as far aft as the engine room, where they widen out to 34 feet at the forward end and conform to the run of the boat as it extends aft. The main stanchions, except at the sides of the boilers, are of white oak and placed at a distance of 8 feet apart. At the sides of the engine room the stanchions will be secured to the deck by angle clamps, but forward of this they will pass through the deck and fasten to the floor beams. Deck rings of angle bar or steel castings will be riveted to the deck and stanchions secured by caulking with oakum. The stanchions at the boilers are of 4-inch iron pipe secured to the deck with cast steel flanges. The carlins are of yellow pine spaced 18-inch centers, checked over clamps 1 inch deep. Each carlin will be in two pieces overlapping 2 feet each side of center and bolted and nailed together and extending outboard to form the boiler deck guard. The carlins will be doubled at the bulkheads or where extra strength is needed. Over the boilers there will be three deck stringers, the center one 4 by 6 inches, and the side ones 4 by 5 inches. From the front of the boilers to the splash bulkhead there will be two stringers, 4 by 6 inches. These are all of yellow pine in long lengths with scarfs three feet long bolted and nailed and secured to caps

vided. The wheel will be 24½ feet in diameter over ends of arms and will have five sets of arms, there being sixteen arms in each set. The buckets will be 17½ inches thick, 34 inches wide and 24 feet long, with balance buckets as required. The arms will be 6½ inches at flange, 11 inches at the circle, by 27½ inches thick. Beyond the circle the back of the arm will be tapered to 8 inches at a point. All the lumber for the wheels will be seasoned white oak except the braces, which will be of pine or poplar. There will be six main boilers of the usual Mississippi river type with 38 inches mean diameter and 30 feet length, each boiler having two flues, 14 inches outside diameter. The boilers will be built for a working pressure of 200 pounds. They will be set in two separate batteries. The chimneys will be 36 inches in diameter and 50 feet high above the grate bars, the chimneys being made of sheet steel. Each battery will have a steam drum 28 inches in diameter and 11 feet long connected to each boiler by legs 10 inches in diameter and 6 inches long double-riveted to each. Two mud drums, 16 inches in diameter and 11 feet long, for each battery will be connected to each boiler by legs 8 inches in diameter, double-riveted. Two feed pumps will be required, each of sufficient capacity to supply both boilers when running at a piston speed of 60 feet per minute, and the pipe connections must be so arranged that either pump can supply either or both batteries of boilers. Pumps will be of the vertical duplex type. The fire pump will be of the horizontal duplex type and have a capacity of 100 gallons per minute delivered at a pressure of 125 pounds per square inch when running at 100 feet piston speed. A fire pipe line will run on each side of the boat and will have three branches on each side on both main and boiler decks and one on each side of the hurricane deck. The fire pumps will be connected to the mud drums of the main boilers and to the water tank in the pilot house, as well as having an independent hose connection.

Three steam capstans, manufactured by the American Ship Windlass Co., will be included in the equipment of each vessel. Steam steering gear will also be provided. The electric light plant, previously mentioned, will consist of a direct-coupled engine and generator of the multipolar type. The searchlight will be 18 inches and of 4,000 candle power. Two arc lights, each of 1,200 candle power, and sixty incandescent lamps will also be provided. The auxiliary boiler of each vessel will be of the vertical submerged type, 42 inches in diameter and 9 feet high, and will be fitted for 200 pounds pressure. Two life boats, each 16 feet long, will be provided as well as a stockless anchor of 700 pounds weight

## WHAT IS TO BE DONE WITH THE CANALS.

A FEW OF THE INTERESTING ANSWERS MADE TO THE COMMISSION THAT IS STUDYING THE TROUBLESOME CANAL QUESTION FOR THE PEOPLE OF NEW YORK.

"What is best to be done about the canals?" is a question asked recently of representatives of shipping interests on the great lakes and in the vicinity of New York City by the committee of canals of New York state, appointed by Governor Roosevelt and which is to report to him before the next meeting of the state legislature. This committee, with headquarters at 11 Broadway, New York, is composed of Francis V. Greene, chairman, George E. Green, John H. Scatcherd, Major T. W. Symons of the United States engineer corps, Frank S. Witherbee, State Engineer E. A. Bond, Superintendent of Public Works John N. Partridge, and John A. Fairlie, secretary. A pamphlet of some 200 pages, just published, contains a large number of answers to the above question. One of them is from Mr. L. M. Bowers, general manager of the Bessemer Steamship Co., representing the extensive Rockefeller interests on the great lakes. Mr. Bowers says:

FROM L. M. BOWERS, BESSEMER STEAMSHIP CO.

"We favor the fourth proposition as set forth in your letter—that is the construction of a ship-canal by the federal government and the aban-

the state of New York. The shipment of grain by lake to Buffalo in 1898 was over 220,000,000 bushels, a large amount of which could have been delivered to the seacoast without handling, by ship-canal, and at a price below railroad competition. The advantages of such a waterway is so great that the estimates for its construction are small in comparison. The advantages to New York state will outweigh any expenditure she may make in securing such a waterway. There is another point that the state of New York may well consider, and that is the effort being made to divert a large portion of the grain now coming to Buffalo by way of Montreal and by southern railroads. There is also a prospect of there being sharp competition for European trade by the railroads of the northwest connecting with steamers on the Pacific coast. Every one largely interested in transportation by rail or ship is aware that the methods employed even five years ago are being discarded today. Cars with a capacity of ten tons were largely in use a few years ago; they were increased to fifteen tons, and today they are loading millions of tons of iron ore and coal in cars that carry fifty-five tons. The same is true with ships. A dozen years ago boats of 700 and 1,500 tons were not small. Four years ago we put in a fleet of twelve ships carrying 4,000 tons on 14½ feet draught of water; we now have twice that number, carrying from 5,000 to 8,000 tons, and several now building still larger. In view of all these facts it seems to me to be a waste of time and money to maintain a waterway of 6 or 8 feet, or even twice that depth, through the state of New York, for as soon as railroad companies put in cars of



AMERICAN LINER PARIS ON THE ROCKS—FROM A PHOTOGRAPH TAKEN FOR THE REVIEW BY GIBSON & SONS, PENZANCE, ENGLAND.

donment of the old canals. We believe that any great expenditure of money to improve the present system under any of the propositions, will be largely wasted, and we will be as far behind the times in the way of cheap transportation in a few years as we are now. On the other hand I believe that the construction of a ship-canal large enough to float vessels of the larger type now in use on the lakes, will be of incalculable benefit to the state of New York and all of the eastern and northwestern states. As large owners of tonnage, we find as the years pass, the railroad companies, by their system of long hauls without transfer of cargoes, are enabled to compete sharply with medium-size lake vessels carrying 2,000 or 3,000 tons; but they do not disturb by competition vessels carrying 5,000 and 6,000 tons; the general expenses of the small ships being within a fraction as great as the expenses of the larger ships. To be a little more definite I will illustrate from our own books. During the month of November, 1898, I find we loaded at the elevators in Duluth, among many others, one large steamer and consort with 473,000 bushels of wheat, which we delivered to the elevators in Buffalo at a cost of (including all expenses, elevator charges, etc.) one cent per bushel, while a steamer and consort carrying 200,000 bushels cost 50 per cent more than that. These cargoes were drawn 1,000 miles. I find that a steamer carrying 100,000 bushels is identical with that carrying 200,000 bushels in every particular, excepting a smaller amount of coal consumed, there being the same number of men and officers in each case. I see no reason why this should not apply to water transportation through

great capacity the canal boats will cease to be a competitor, and in a few years the water will be turned out of the canals whether you adopt the first, second or third proposition, or spend fifteen or thirty or fifty millions on them."

FROM PRESIDENT HILL OF THE GREAT NORTHERN RY.

Mr. James J. Hill, president of the Great Northern Ry. and Northern Steamship Co. of the lakes, and who is also interested in grain elevators at Buffalo, as well as railway connections between Buffalo and the seacoast, says:

"The entire question of canal communication between the great lakes and the port of New York is one that deeply interests the whole country north of the Ohio river, and particularly the north-western states. A canal which would take less time and greatly less money to build would follow the River St. Lawrence to the vicinity of Montreal and there turn south by way of Lake Champlain, but during the time of open water for such a canal the port of Montreal would be open to seagoing vessels, and I see no reason when a canal was built to within sight of Montreal harbor, where it could reach sea going ships and with harbor dues much less than those in the port of New York, why any traffic other than such as might be locally required for consumption at intermediate points or in the City of New York should bear the additional expense of transportation for say 400 miles from Montreal to New York. I do not think the national sentiment would be enough to pay the financial cost. If the

present Erie canal were enlarged and deepened to a depth of 10 feet, so that canal boats of 3,000 tons might be used, it is more than likely that the best practical results would be obtained in this way. I do not know whether it would be possible to take water from Lake Ontario by way of the Oswego and Erie canals to the Hudson river. The low rates of rail transportation have at times made it impossible to operate the canal boats now in use profitably in the grain traffic between Buffalo and New York, and it is not by any means certain that with improved facilities for handling grain at terminal points and other favorable conditions, the rail rates have reached their lowest limit."

FROM ENGINEER ALFRED NOBLE, OF CHICAGO.

Mr. Alfred Noble, engineer of Chicago, who is a member of the board of engineers on deep waterways, which is now engaged, under act of congress, in investigating routes and making surveys pertaining to navigation between the great lakes and the Atlantic seaboard, says he can not discuss the propositions usefully. The really vital propositions set forth by the committee, he says, are the third and fourth. The third

propositions," says Mr. Noble, "on the basis of these estimated costs. I do not believe that a canal with a depth of 12 feet, suitable for barges of 1,200 to 1,500 tons and equipped for a traffic of 25,000,000 tons per annum, can be built from Lake Erie to the Hudson river for \$50,000,000; nor do I believe that a waterway between these terminals with a depth of 30 feet will cost \$500,000,000. A discussion based on such premises would be futile. The data are not yet at hand for correcting these estimates of cost. The deep waterway board will be able within a few months to present an estimate of cost for the 30-foot channel based on extensive surveys, but any estimate for the barge canal must be based on extremely superficial data until the line shall be thoroughly surveyed. It is perhaps pertinent to suggest that a better barge line from the lakes to the seaboard will be provided within a few months on the completion of the improvements now in progress on the Canadian canal and that a waterway from Montreal to Lake Champlain, affording access for barges to convenient distributing points to our eastern markets would not be costly. In some way the transportation of the products of the northwest to the



Permission Literary Digest.

SENATOR SAMUEL PASCO, OF FLORIDA.  
LIEUT.-COL. O. H. ERNST, U. S. ARMY.  
PROF. LEWIS M. HAUPT, OF PENNSYLVANIA.

PROF. WILLIAM H. BURR, OF CONNECTICUT.  
REAR-ADMIRAL JOHN G. WALKER, CHAIRMAN.  
PROF. EMORY R. JOHNSON, OF PENNSYLVANIA.

GEORGE S. MORRISON, OF NEW YORK.  
COL. P. C. HAINS, U. S. ARMY.  
ALFRED NOBLE, OF ILLINOIS.

#### NEW ISTHMIAN CANAL COMMISSION.

proposition is to construct a barge canal continuously descending all the way to the Hudson river from Lake Erie, with a depth of 12 feet, and suitable for barges of 1,200 to 1,500 tons, which can be towed on the lakes if desired. The cost of this is approximately estimated at \$50,000,000, and the saving at 1.55 cents per bushel of wheat from Buffalo to New York, or a reduction over present cost of 1.8 mills per ton mile to 0.6 of a mill per ton mile. Its capacity is estimated at 25,000,000 tons per annum. The fourth proposition is to construct a ship-canal with a depth of 20 to 30 feet, suitable for lake and ocean vessels of 5,000 to 10,000 tons capacity. The cost of such a ship-canal, depending upon its size and route adopted, is estimated at from \$200,000,000 to \$500,000,000. This ship-canal project is under consideration by the federal government, congress having appropriated \$240,000 for surveys and authorized the appointment of a deep waterway commission (board of engineers above referred to) which is now vigorously prosecuting surveys along the Oswego-Mohawk and the Champlain routes with a view to forming an accurate estimate of the cost.

"I should not be willing to discuss the comparative merits of these

consumers will be facilitated and it is worthy of consideration whether the propositions to be compared are not on the one hand transportation by small steam vessels or barges on the Canadian route, and on the other, transportation by deep-draught steamships through a great waterway to be provided by the United States government."

After a thorough investigation, the quartermaster's department of the army has decided to equip the boats of all the transports with releasing hooks of the kind made by the Standard Automatic Releasing Hook Co., 22-24 State street, New York. This company recently filled an order for 100 sets of hooks for vessels in the transport service sailing from San Francisco.

The Nickel Plate road in connection with its excursion to Niagara Falls on Aug. 3 will sell tickets from Niagara Falls to Montreal for \$9.50 extra. Liberal return limit. A peerless trio of fast express trains daily. Ask agents.

104, Aug. 10.

# MARINE REVIEW

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Vessels formerly in the auxiliary fleet of the United States navy, and recently offered for sale by the government, have all been disposed of. The city of Boston again became the possessor of the ferry boat Governor Russell on a bid of \$25,000. The ferry boat East Boston went to Arthur J. Phillips of Portsmouth, Va., for \$38,091. The Merchants' & Miners' Transportation Co. of Baltimore bid in the Vulcan, formerly its liner Chatham, at \$175,000. Lewis Luckenbach of New York, gets the Scipio at \$50,025 and President H. P. Booth of the Ward line, bid in the Niagara at \$75,563. The yacht Enquirer, formerly the property of W. J. Conners of Buffalo, was withdrawn from the sale.

Holders of contracts for unfinished work on the Erie canal eagerly availed themselves of the provisions of an act passed by the last New York legislature whereby all holders of unfinished contracts might within sixty days make application to the state canal board for cancellation. The time has now expired and it is found that application has been made for the cancellation of thirty-three contracts aggregating \$453,960, out of a total of forty-five contracts. The twelve contracts still in force amount to about \$3,062,884. Holders of these latter contracts have already received \$969,201 and the state has retained on the 10 per cent clause \$162,280.

Andrew Carnegie, Henry W. Oliver and H. C. Frick, all leaders in the Carnegie steel organization, now have big ore carriers in the fleet of the great lakes named in their honor. H. C. Frick is the name selected for the steamer owned by Capt. John Mitchell and others of Cleveland, which is to be launched from the Globe yard of the American Ship Building Co. at Cleveland on Saturday, Aug. 5. This vessel, to be completed in September, is 6 feet longer than the steamer M. A. Hanna of the same fleet. A duplicate steamer, building at the same yard for the same owners, the Cleveland Steamship Co., will not be completed until next spring.

The first of the new type of traveling derrick designed and constructed by the Maryland Steel Co., Sparrow's Point, Md., and which was fully described in the Review some time ago, has been placed in operation at the company's yard and gives entire satisfaction. This derrick, the construction of which is on the order of the Eiffel tower, is 90 feet in height, 20 feet width and has two hoisting booms. The tower is mounted on a car platform, which runs on an 11-foot track, and which holds the four drums and the necessary steam hoisting apparatus. The derrick has a capacity of 10 tons and can raise material to a height of 70 feet.

The French naval committee report that the battleship Charlemagne, the cruiser Distreer, four torpedo-boat destroyers and twenty-five torpedo boats will be completed within the year 1899, and that two battleships, one cruiser, two gunboats, fourteen torpedo-boat destroyers, a submarine torpedo boat and a turbine torpedo boat will be added to the list in 1900. It is stated that four of the torpedo boat destroyers soon to be laid down will each be of 303 tons displacement, and with 38 tons of coal are expected to run 2,300 miles at 10 knots or 220 miles at their full speed of 26 knots.

At the works of the Federal Steel Co., South Chicago, the ore docks are operated night and day, every day in the week, throughout the season of navigation, provided, of course, there are vessels to be unloaded. A sample of the kind of dispatch that is given to vessels under these conditions is contained in a note from the captain of a 4,500-ton steamer to the owner. "I reached here at 11 a. m., Saturday," he said, "and found eleven vessels in port with ore, but I got out Sunday afternoon."

## YACHT RACES FOR THE AMERICA'S CUP.

The coming international yacht race has revived interest in the volume entitled "Yacht Races For the America's Cup," which was published some years ago by the Outing Co. of New York, and the sales of the book have in consequence taken a decided jump upward of late. The author of the book, Capt. A. J. Kenealy, is one of the recognized authorities on yachting in America, and his conclusions are based upon experience, for the captain has had the good fortune to witness nearly every great yacht race, international or otherwise, sailed on this side of the Atlantic since 1880. During his years at the head of the yachting department of the New York Herald he enjoyed every facility for viewing the Puritan-Genesta, Mayflower-Galatea, Volunteer-Thistle and other contests. The "Yacht Races," without which no yachting library can make pretensions to completeness, embodies an account of the America's victory at Cowes in 1851 and subsequent contests for the trophy; also the mission of the Navahoe in 1893. The book is profusely illustrated with portraits and drawings. It is published by the Outing Co. of New York. Price 50 cents. The Outing Co. publishes also at \$1 Capt. Kenealy's recently completed work, "Yachting Wrinkles."

## ICE-BREAKERS.\*

A WELL-KNOWN BRITISH AUTHORITY DISCUSSES AN INTERESTING TYPE OF VESSEL, THE DEVELOPMENT OF WHICH HAS BEEN SIMULTANEOUS IN EUROPE AND AMERICA.

BY H. F. SWAN.

There can be no doubt that the employment of ice-breakers is destined to become a very important factor in connection with steam navigation generally, and that many ports which formerly were partially, and others entirely closed during the whole of the winter, will become available for commerce all the year round. The first record that we have of an ice-breaker is the Pilot, belonging to the port of Cronstadt. She was a small single-screw tug with very sharp lines and great rise of floor. Her owner, the Russian merchant Britneff, conceived the idea that such a vessel could be utilized for ice-breaking, and therefore had her bow altered so that she could be forced up on to the ice, which was then broken by her weight, and although owing to the smallness of the vessel, she could only deal with ice of comparatively small thickness, she embodied the germ of the idea which was destined to have important developments.

The Hamburg authorities, having heard of the Pilot's success, decided to have ice-breakers specially constructed for service on the Elbe, the first being Eisbrecher I., built in 1871 and of 600 indicated horse power. From time to time the size and power of these vessels was increased, and their success was such that ice-breakers have now come to be looked upon as a regular part of the harbor equipment, and are able to keep the navigation open throughout the winter. In the meantime, various Scandinavian countries with ice-bound harbors had turned their attention to the subject and a number of vessels, both to be used as ice-breakers pure and simple and also as ice-breaking ferry steamers, were built, some being propelled by paddles and others by screw propellers both of the single and twin description. Particulars of these vessels are given in the paper which Capt. Tuxen of the royal Danish navy read at the international congress of naval architects, held in London in July, 1897, and the illustration which he gave of the Sleipner, belonging to the port of Copenhagen, of 1,400 tons displacement and 2,600 indicated horse power, is a fair representation of the type of ice-breaker in use up to that time; a main feature being the cutting away of the forefoot from a point on the stem above the water line in a slanting direction, and striking the keel line about one-fourth of the vessel's length from the bow, this form naturally facilitating the mounting of the vessel on to the ice field.

Our enterprising friends the Americans had for some time been using ferry steamers so constructed as to be able to make their way through ice of considerable thickness, and they accidentally discovered that a single-screw steamer of this type when leaving an ice-bound wharf was able to make her way out better by going astern than ahead, as the disturbance of the water by the propeller had a disrupting influence of a much more important character than might have been supposed. The idea thus given was immediately taken advantage of and embodied in the next vessels to be built, which were given the bow propeller, the first to be so fitted being the St. Marie, built in 1893 for service on the great lakes. Experience with the latest ice-breakers so constructed has proved that not only is the bow propeller very valuable, but is almost indispensable where heavy packs of ice have to be dealt with. With the exception of some of the American vessels, which were built of wood, the whole of the others have been built of iron or steel, of which latter material all the more recent vessels have been constructed.

It would be impossible in the limits of a paper of this description to give many details as regards the construction of such vessels. It will however, be interesting to the members if I give a few particulars of two vessels built last year, embodying all the latest practice, and which have been at work during the past winter with eminent success. These vessels were the Sampo of 2,000 tons displacement and 3,000 indicated horse power, built for the Finnish government, and the Ermack of 8,000 tons displacement and 10,000 indicated horse power, built for the imperial Russian government. The Sampo has one single propeller aft and another one forward, and her chief dimensions are: Length, 202 feet; beam, 43 feet; depth to upper deck, 29 feet 5 inches. Her bow and stern have considerable overhang, the contour being such as to strike the ice at a very acute angle, so that when the vessel is driven with considerable force she has a tendency to rise on the ice in a slanting position, which, while it conduces to bringing her maximum weight to bear, does so in a manner which mitigates the blow to the vessel herself.

The Ermack marks an immense stride in the construction of ice-breakers, being fully three times as powerful as any vessel previously constructed; moreover she has four propellers, three placed aft and one forward. Her principal dimensions are: Length over all, 305 feet; beam, 71 feet; depth to upper deck, 42 feet 6 inches; the contour of her bow and stern also shows a quite exceptional amount of overhang, and both she and the Sampo had their sides inclined outwards at a considerable angle from the vertical, to lessen the strain when the vessels are being nipped in the ice floes. The whole construction of the Ermack is exceedingly strong and she is subdivided into forty-eight compartments, the watertightness of which has been tested in the most efficient manner, and as an example it may be mentioned that after the vessel was launched, and her engines and boilers fitted on board and all complete, one of the boiler-rooms was filled with water to the upper deck, the bulkheads practically showing no deflection. This is probably the most severe test to which the bulkheads of any ship have ever been previously subjected, and as the other parts of the hull are relatively as strong this gives a good indication of the vessel's solidity. The frames are placed 12 inches apart, and the thickness of the ice belt varies from 1 1/4 inches at the ends where most of the ice-breaking is to be done, and is slightly reduced in other parts less exposed to shocks when breaking ice.

In ice-breakers generally, it is highly important to have a model of a

\*Paper read at the summer meeting of the Institution of Naval Architects, held at Newcastle-on-Tyne, England, July, 1899. Mr. Swan is of the firm of Swan & Hunter, Wallsend-on-Tyne.

rounded form, and to have the outside surfaces as smooth as possible, both seams and butts for this reason being flush plated. It is desirable also that the vessels relatively should be short and broad, as this is found to greatly assist their maneuvering in ice, and prevents the broken pieces from clinging to the shell plating. It is also important to have the pumps of enormous power, connected with trimming tanks both at the bow and stern, and also at the sides of the ship, so that if the vessel gets caught in the ice her horizontal plane may be varied in any sense desired, whereby she can the more readily release herself.

Experience with the Sampo and Ermack has shown that pack ice of practically any thickness can be negotiated; and in the case of the latter vessel, she on one occasion encountered a pack which was measured and found to be of a total thickness of 34 feet, 9 feet being above the level of the field, and through which she successfully forced her way—a feat which would have been quite impossible but for the action of the forward propeller. As regards the propellers themselves, I may mention that we have made them both of bronze and of nickel steel, and have not so far had a broken blade, and this in spite of the fact that on many occasions the engines have brought up “all standing,” which, I need hardly say, requires their being designed in all their working parts, both as regards scantlings and surfaces, on a basis greatly in excess of what is usual in machinery for ordinary purposes. The Ermack has broken composed ice of 8 feet 3 inches in thickness, and she has gone through field ice of about 40 inches, with 6 inches of snow upon it, at a speed of  $2\frac{1}{2}$  to 3 knots; moreover, she has been driven at a speed of about 10 knots through clear ice of 24 inches, whilst ice under 18 inches has little effect upon her. It is found that snow has a wonderfully great retarding influence upon an ice-breaker, much more so than a similar thickness of solid ice.

Maneuvering powers of the Ermack are remarkable, seeing that with her helm only she can turn in a circle of only twice her own length, and her handiness was specially shown when she entered the frozen-up port of Cronstadt on March 16 last, proceeding without stopping through an entrance only 95 feet wide and berthing herself alongside the quay without assistance, whereas under ordinary circumstances of navigation in open water, steamers are in the habit of invariably being assisted by tug boats. Her practical utility was not long in being put to the test. Immediately on her arrival urgent word was received from Reval that a number of steamers were in great jeopardy; she at once proceeded there, and was the means of liberating thirty-three steamers of an aggregate value of \$7,500,000. She subsequently returned to Cronstadt and St. Petersburg and was instrumental in relieving and facilitating the entry of some forty more steamers several weeks earlier than if they had waited the ordinary opening of navigation. The above performance is a very conclusive proof of the commercial value of such a vessel. When a passage has once been broken, vessels of ordinary construction can usually follow in the channel thus made without suffering injury; where, however, vessels are intended to work regularly in this way, it would be advisable to give them a little additional strengthening, especially as regards the bow, and as regards the propeller, this had better be of steel somewhat stronger than ordinary practice.

It is necessary here to point out that all the foregoing remarks apply to ice-breaking in the Baltic, or where the ice is formed gradually at moderate temperatures, and that the same result could not be looked for in the case of service in the Arctic regions where the ice is of a much harder and more brittle description, and it probably would not be prudent to have the bow propeller shipped when a vessel is employed among the heavy ice of the Polar seas. In connection with the Ermack I must not fail to mention the name of Vice-Admiral Makaroff, of the imperial Russian navy, but for whose personal initiative this important vessel would never have been built, and from whom we received very much valuable assistance during the vessel's construction.

A very important application of ice-breaking steamers is shown in their ability to form connecting links in railway systems in crossing large stretches of water—which it would be either impossible or too costly to bridge—and of which we ourselves have had two notable examples. Near the town of Saratoff on the river Volga, there is an important railway traffic, which during the winter was practically suspended and could only be carried on in a desultory way when the ice was strong enough to bear sledge traffic; but there were occasions both in the spring and autumn when communication, either by sledge or navigation, was absolutely impossible. In this case there was a further difficulty in the large range in the depth of water; it sometimes was as low as 10 feet; but with the melting snows in spring the water rose to the extent of 45 feet. It became necessary to design a vessel which could not only contend with the ice, but load and discharge the railway wagons at varying heights. We therefore proposed a twin-screw vessel of the following dimensions: Length, 252 feet; breadth, 55 feet 6 inches; depth, 14 feet 6 inches. This vessel has four lines of rails, each pair converging into two hydraulic lifts placed side by side at the bow of the vessel, and it is found in practice that the full load of twenty-four cars can be run off or on to the shore in half an hour, and this at varying heights according to the depth of the water. Owing to the limited draught of the water it was not possible to give this vessel the necessary form to break the heaviest ice, the thickness sometimes being as much as 3 feet; she therefore under these circumstances works in conjunction with a twin-screw ice-breaker of the ordinary type of 870 tons displacement and 1,500 indicated horse power; but when the ice is of moderate thickness, say about 20 inches, the ferry boat is able to work without assistance. These vessels have now been at work for three seasons, and have maintained the railway service without a single day's interruption.

The other important ferry ice-breaker is that which is now being erected on the shores of Lake Baikal, and which when completed will form an important connecting link in the great Siberian railroad, the lake at the point in question being forty miles wide. This vessel has a displacement of 4,200 tons, is 290 feet long, 57 feet beam, and 28 feet 6 inches deep to the rail deck. She is fitted with three sets of engines of an aggregate power of 4,000 horses, two sets being placed aft, driving twin-

screw propellers, the third set being at the bow. This vessel has three lines of rail laid on her deck, but as the height of water in the lake does not materially vary, connection with the shore can be made by a movable gangway. As the weather in the lake at times is very stormy it is found desirable that the carriages should be under cover; therefore the vessel is built with a closed superstructure, which gives her very much the appearance of the American lake steamers. In the superstructure is also provided very extensive accommodation for the passengers, who will find it more convenient than being cooped up in the railway carriages during transit. The construction of this vessel marks a record in ship building; the vessel, after being erected in our yard on the Tyne, was taken to pieces, shipped to St. Petersburg, and thence taken a distance of about 5,000 miles overland to the shores of Lake Baikal, which would have been difficult enough had there been railway transit the whole distance, whereas a considerable portion of the road had to be covered by sledge, and this, considering the great weight of parts of the machinery, and including as it did her fifteen main boilers, was a task of some difficulty. The vessel is to be launched this summer, and to be ready for next season.

In conclusion, I can only reiterate my belief that the employment of ice-breaking vessels has not yet reached anything like the importance that it will yet achieve, and that still more important developments in this class of vessel may be expected in the future.

#### HYDRAULIC DREDGE FOR RIVER WORK.

Capt. Chester Harding, United States engineer at Grand Rapids, Mich., will on August 28 open bids for the construction of a hydraulic dredge for service in the improvement of Grand River, Mich. The dredge will be wooden hulled and of not more than 30 inches draught when equipped for work. The craft will be capable under ordinary service conditions of dredging continuously at the rate of 400 cubic yards per hour, measured in place, of sand, mud or other ordinary material that can readily pass the pump and be discharged hydraulically, from a depth of 15 feet or less below water surface and through a discharge pipe 500 feet long, resting on floats. The dredge will be manoeuvred up stream by means of two wire cables attached to mooring piles and wound by steam power upon drums located on the dredge. A spud will be provided in the axis of the dredge near the stern, fitted with an iron shoe and furnished with suitable means for its operation by steam power. The suction pipes will be forward and the discharge pipes will pass from the pumps into the hold and thence aft to the stern of the dredge, where they will unite by easy curves into a single pipe of cross section equal to the combined areas of cross section of two pipes.

The hull is to be of white oak and the freeboard will be not less than 2 feet. The thickness of sides and bottom planking is to be no less than 3 inches and the deck plank will be of white oak of a uniform width of 6 inches and a thickness of 3 inches. The space inclosed on the main deck will include a machine and tool shop, store room, and coal bunkers of a capacity of 48-hours' supply of coal. A cabin on the boiler deck will afford accommodation for a crew of twenty men, and provision will be made for office, mess room, state rooms, kitchen, pantry, store room, lavatories, water closets, etc.

Two main pumps of equal capacity will be provided. Each is to be of the single-suction centrifugal type of one-half the required capacity of the dredge. The pump runner is to have detachable soft steel blades, which may be readily removed in the event of breakage, and arrangements are to be made for the free entrance of the dredged material from the suction pipe into the center of the pump unobstructed by the rotating wings of the runner. The two pumps will be operated by a single engine, and the pump shafts will be connected to the engine shaft in such manner that each may be promptly thrown out of gear in case it becomes obstructed from any cause. The main engine which is designed to drive the pump runners, will be horizontal but may be either simple or compound at the option of the bidder. Separate engines will be provided for moving the dredge, hoisting the suction, working the spud and operating the steam capstans. A separate engine and drum will also be provided for winding each 1,000-foot wire cable, which will be utilized in pulling the dredge up stream. This latter engine will be capable of pulling the dredge against a current of 3 miles an hour at a speed of 30 feet per minute. The main boilers are to be set up in a single battery and will have a working steam pressure of 150 pounds per square inch. The dredge is to be completed and ready for service by April 1, 1900.

#### SUBMARINE TORPEDO BOATS.

Representatives of the Holland Submarine Torpedo Boat Co. have notified the secretary of the navy that they are ready at any time for the final test of the submarine torpedo boat Holland by the naval officials, and Secretary Long has stated that he will in the near future set a date for the test. In all previous trials dummy torpedoes have been used, but in the coming test a real Whitehead torpedo will be used, and upon the ability of the vessel to strike and destroy a target will depend her chances of acceptance for service in the United States navy.

Trials of the boat in the vicinity of New York during the past week have been in some respects highly satisfactory. The boat was submerged and run for a mile under the surface. At the first trial the sinking, which was accomplished by letting five tons of water into the midship tanks, was done in 7 seconds and on the second trial in 9 seconds. Two thermometers were used in taking the temperature while the boat was under water, and in each case 81 degrees Fahrenheit was indicated. When floating on the surface the temperature in the boat was 77 degrees. During most of the journey under water an even keel was maintained, and in spite of tides and currents the course was kept straight.

The Holland company wishes to remove all the machinery from the Plunger, another boat of earlier design, building at the Columbian Iron Works, Baltimore, Md., and substitute an entire new installation. Their proposition is being considered by the naval board appointed to inspect the machinery. The board consists of Constructor William H. Varney, Lieut. Frances Haessler and Lieut. D. C. Redgrave. There is a strong probability that permission will be granted.

## A GREAT LUMBER PORT.

In the matter of lumber shipments Manistee, Mich., takes high rank among the ports of the great lakes. In vessel interests the port is, however, far from noteworthy, the fleet which hails from there consisting of but eight steamers and seven schooners the aggregate value of which does not exceed \$230,000. The export trade, however, is heavy as is evidenced by the fact that during 1898 a total of 1,009 vessels cleared from the custom house with cargoes that included 173,666,000 feet of lumber, 85,085,000 shingles, 10,476 cords of bark, 335 cords of slabs and 90 cords of wood. There are fifteen saw mills at Manistee and a number of the lumber firms own their own vessels or operate them under lease.

One of the well known vessel interests of Manistee is the Canfield tug line, which has long enjoyed the reputation of being one of the best line of tugs on Lake Michigan outside of Chicago. The tugs at present in service are the Irma L. Wheeler, Frank Canfield, Frank Barnes and Charles Gnewuch. A full wrecking equipment, including pumps, etc., is

## GRAIN ELEVATOR SITUATION AT BUFFALO.

Buffalo, Aug. 2.—The second hearing before the State Commerce Commission brought out a good deal of information in regard to the workings of the harbor elevators, of course, but it left a very interesting story entirely untold. There is a good report of the work of the elevators, though few people suppose that there is to be a long continuation of the present condition of their management. It is too mixed and there are too many interests left out. The statement that five of the pooled rail elevators are idle so far this season is of small moment, for there must be some reserve if the fall business is taken care of. To run everything through the summer would cost more than to keep open only enough to take care of the current business.

There is a sorry contest for business between the pooled rail houses and the others, which are called canal houses on account of their lack of rail connections. Some of the rail-elevator managers were at the opening of the season anxious to see the canal houses given some sort of



SCENES IN MANISTEE HARBOR.

(Courtesy Manistee News.)

always kept at hand. The Canfield line was established in 1867 by John Canfield and A. G. Wheeler and has been continued uninterruptedly ever since. The Smith tug line was established in 1873 by Smith & Rumben, and after the dissolution of the partnership was continued by Mr. Smith. Mr. Smith is also one of the owners of the Manistee & Milwaukee Transportation Co., having an interest in the steamer Mark B. Covell, which the company operates.

The Newport News Ship Building & Dry Dock Co. is understood to have under consideration the use of electricity to a much greater extent than at present. According to reports, the plan is to utilize electrical power for the operation of many machines now operated by steam. A change of power will be made, it is said, in the case of the traveling cranes now operated by steam and also for many of the tools in the yard.

The Nickel Plate road will run another of its popular excursions to Niagara Falls, Saturday, Aug. 12th. Train leaves Cleveland at 10.10 P. M. Bring your family and enjoy a good time at the Falls on this date. For rates and time of departure of train at intermediate points inquire of agents.

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a showing and still others favored letting them alone, to earn what they could in their own way. They were badly enough handicapped to make them fairly harmless. But the majority ruled otherwise and as soon as the canal houses began to cut the half-cent pool rate, as they had to do to get any business, the pool cut too, and the natural result is that no canal grain pays anything for elevation, and that with no special regard for the canal.

This naturally puts the canal-elevator owners to their stumps for a chance to get even. As the matter stands now it is devise a new scheme or go to the wall. There are several very good elevators of moderate size in this group, whose nominal value is considerable. The plan hit upon is to combine the group that occupies the small islands formed at the foot of Main street by cutting slips through from Buffalo creek and its parallel waterway, the Blackwell canal. There are the Lyon, Richmond, Hefford, Brown and Watson, of which only the last has been operated of late. The slips that separate these elevators are no longer used and it is planned to use one of them as the mooring place of a car ferry and then all that will be needed for full rail connection is to run tracks the full length of the islands, using the ferry as part of the system.

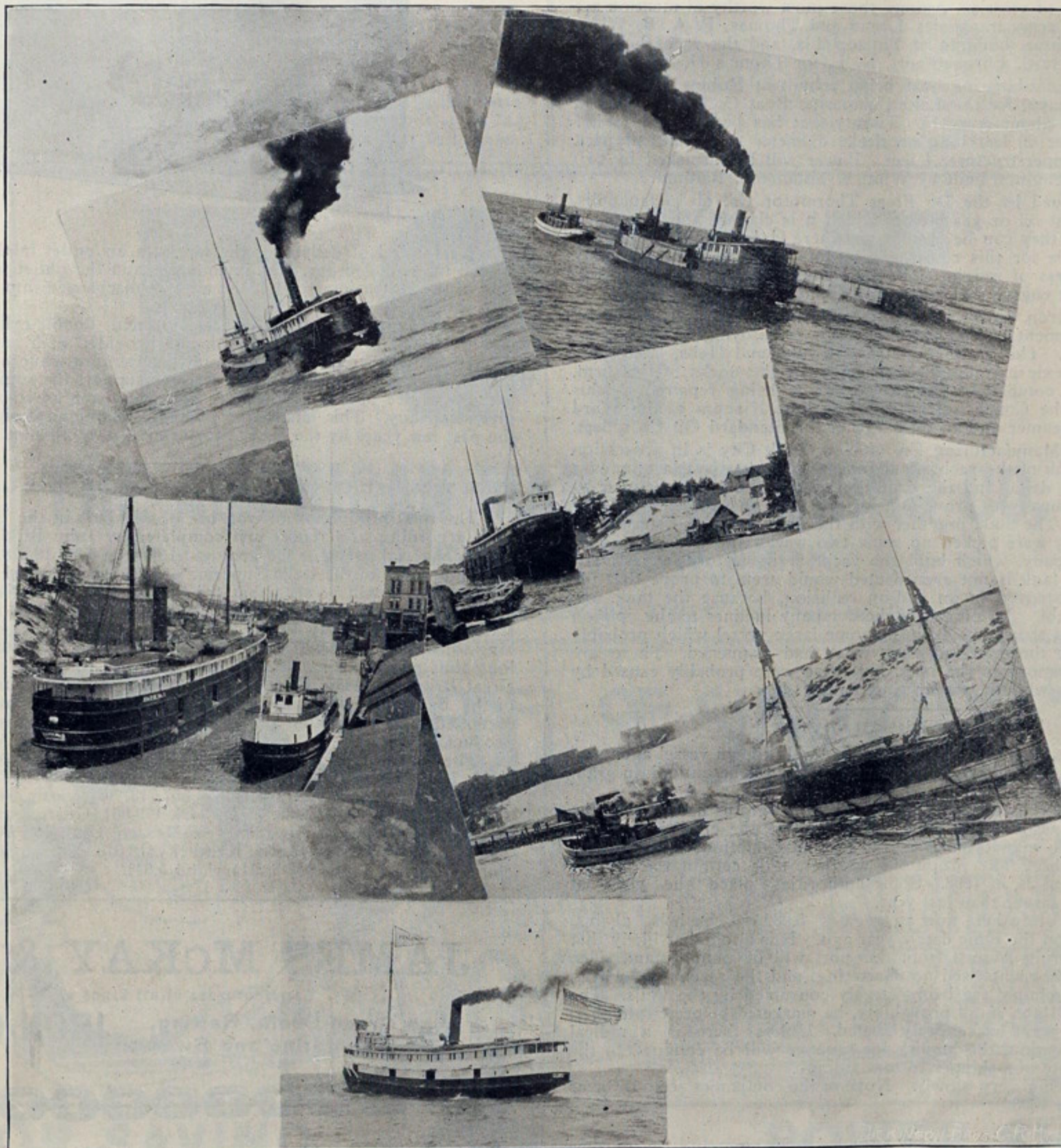
When it is loaded it can be hauled to the main shore and connect with tracks there.

It is odd that this idea has not been brought out before, as it is an easy thing to accomplish. Probably the elevator business has, till quite lately, been too "easy" for ventures to flourish that required new outlay of money. It is different now. The steel elevators have raised hob with the old wooden ones and the wooden ones are sadly divided in interests, as the above shows. A second plan, which will bring the despised "canal" group of elevators to the fore quite as much as the car-ferry idea can, is to add to their capacity materially by setting up steel tanks in connection, much on the plan of the new Electric elevator, which is perhaps the most successful of any in the harbor. By using the existing machinery nothing but tanks and conveyors would be needed.

It is shrewdly suspected, and in fact is claimed boldly by certain harbor men, that the real animus of the venture is to get "in" with the pool elevators again. If the canal houses could be accorded a moderate

#### LIQUID FUEL ON THE TALBOT.

Preparations are going forward nicely for the trials of oil fuel on the torpedo boat Talbot. The installation of the necessary machinery has been going on under the direction of representatives of the Consolidated Gas Fuel Co. of New York at the Norfolk (Va.) navy yard for some three weeks past, and ten days more will suffice to complete the work. The plant on the Talbot consists of two large tanks, from which oil is forced by compressed air through pipes to the furnaces. A special burner has been placed under each boiler, and it is claimed that by the use of one of these burners 160 pounds of steam can be generated in 9 minutes from a perfectly cold boiler. The oil used is non-explosive, made from refuse of oil refineries, and is consequently very cheap, it being asserted that its cost is not more than 50 per cent that of coal. Another claim made for the liquid fuel is that it will enable the vessels to remain on an even keel, whereas when coal is used the small class of vessels have a tendency to list, making trimming necessary frequently. The plan of



DAILY SCENES IN MANISTEE RIVER.

(Courtesy Manistee News.)

sharing in the pool earnings, they would stay idle, as they used to. No doubt they would accept a considerably smaller proportion than in former seasons rather than make a new venture involving serious cost and doubtful success. So there are quiet charges made that the new "plan" is now leaking quietly out so that it comes to the ears of the pool men, just to see what they will do about it. As to motives it would be hard to state with fairness, but the facts appear to be pointing that way.

The new idea will be watched with interest by everyone, for it means much to the future of the elevator system here. It may come to nothing, but the canal elevators are out unless something is done for them.

The Nickel Plate road offers special excursion rates to Denver, Colo., account Masonic national convention. Tickets available Aug. 4th, 5th and 6th, good returning Sept. 1st, 1899. Stopover privilege and choice of different routes west of Chicago given. Low rates. For particulars inquire of agents. No. 107. Aug. 6.

overcoming lists in the vessels using oil is to pump sea water into the tanks as rapidly as the oil is taken out. The Talbot will have her trial in Chesapeake bay between Old Point and Buckroe beach, and will then go to Annapolis to be inspected by the cadets and officers of the naval academy. Later she will be taken to New York. The Consolidated Gas Fuel Co. has contracted to similarly equip two other vessels—a tug at Norfolk and another torpedo boat, probably the Gwin.

Fully \$40,000 will be expended on improvements just begun at the Brooklyn navy yard on the cruiser Buffalo. It is expected that when this work is completed the Buffalo, which was formerly the El Cid of the Morgan line, will be one of the finest vessels of her class in the United States navy. The entire interior of the vessel will be remodeled; engine refitted and condensers retubed; an ice machine and an evaporating plant installed and regular man-of-war quarters provided. After the Buffalo has been painted white and fitted with a number of modern guns she will be placed in the transport service between New York and Manila.

## TRADE NOTES.

A shipment of two large steam pumps to Mexico has been made within the past few days by the Dean Steam Pump Co. of Holyoke, Mass.

It is understood that the 300-foot addition which the Babcock & Wilcox Co. is making to its plant at Elizabeth, N. J., is the initial move in a general rebuilding plan.

A contract for the entire supply of forges and blowers for use in the temporary machine shops on the Port Arthur section of the Chinese Eastern railroad has been secured by the Buffalo Forge Co., Buffalo, N. Y.

The Wellman-Seaver Engineering Co. of Cleveland, has just secured a \$1,500,000 contract for an extensive enlargement of the plant of the Newport Iron Works, at Newport, Wales. They bid against English, French and German contractors.

The Allen Dense Air Refrigerating Machine, manufactured by H. B. Roelker, 41 Maiden Lane, New York, is being installed just now on a very large number of vessels. Among those most worthy of mention are the United States army transports Logan and Thomas, P. A. B. Widener's yacht Josephine, building at Philadelphia, and the yacht building at Lewis Nixon's yard, Elizabethport, N. J., for Thomas H. Lawson.

The Argonaut, submarine boat being rebuilt at Robins Erie Basin Dry Docks, Brooklyn, for the Lake Submarine Boat Co. of New York, will be completed about Aug. 15. Twenty feet has been added to her length, making her 66 feet long on deck; diameter of cylindrical part, 9 feet; depth of superstructure, 4 feet. Power will be furnished by two 30-H. P. gasoline engines, built by White & Middleton, Baltimore.

A booklet issued by the De Frees Thermotor Co. of Indianapolis, Ind., tells all about oil or gas motors which it is claimed they manufacture cheaper than they can be bought anywhere else in America. Some of the claims made for this company's motors are durability, economy of fuel and lightness of weight. The De Frees company makes a specialty of an upright engine that is especially suited to marine service.

The Morgan Iron Works, foot of East Ninth street, New York, now under the management of Stephen W. Roach, is enjoying an exceptionally busy summer. The Ward line steamers Juno and Hebe, lately purchased for the Mexican trade, have recently left the docks of this firm, where they were completely overhauled. Now being repaired at this firm's docks are the Concho of the Mallory line, Niagara of the Ward line, and a tank steamer and an oil barge of the Standard Oil Co.'s fleet.

The Daimler Manufacturing Co. of New York City is in possession of the gasoline tank of the yacht Paul Jones, which was lost last January in the Mississippi delta, and the condition of the tank is claimed by officers of the company to prove conclusively that an explosion did not wreck the yacht. The tank, together with the main beam and stern band of the Paul Jones, were picked up some two weeks ago and shipped to the Daimler company, which built the yacht at its factory at Astoria. The fact that the tank is not even dented would seem to prove that the yacht was not destroyed in an end-on collision, because the tank was forward in the yacht. An official of the company inclines to the opinion that the Jones was struck amidship by some large vessel which probably passed on without the crew knowing what had happened. There are three small perforations in the tank, but these were probably caused by contact with rocks while it was drifting about.

## A BOUNTIFUL HARVEST.

Duluth, Minn., Aug. 2.—La Salle & Co., well known vessel agents of this port, send out the following short summary as to the outlook in grain freights:

"Interest here centers in the forthcoming grain harvest in the Dakotas and Minnesota. The crop is approaching the critical state and there is no limit to quotations as to the present conditions and probable yield. With anything like propitious weather, it is certain the harvest will be as bountiful as in 1898. Some authorities place the yield at 25,000,000 bushels larger than last year.

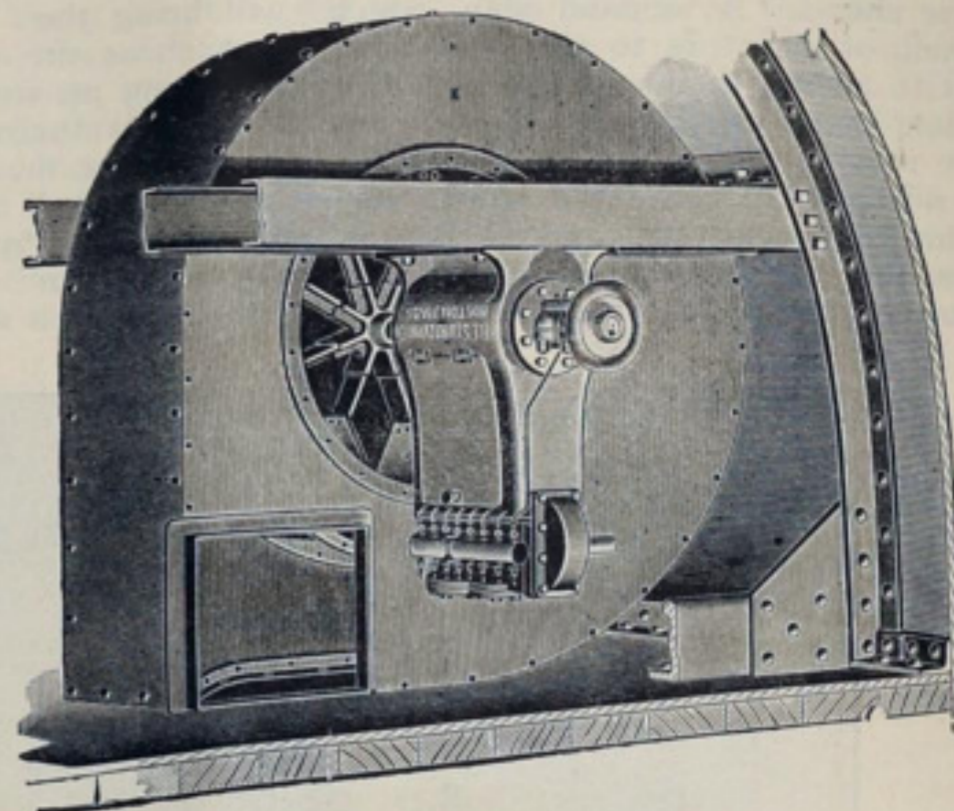
"The grain in store here now aggregates 5,282,700 bushels, against 3,816,504 in store on the same date a year ago. It is altogether likely that the movement during August from this port will be unimportant. The week just closed has witnessed no chartering, and the receipts of wheat, although of fair volume, are being largely consumed by the mills. The wheat in store will not, in all probability, be marketed before September. The demand for grain has entirely abated. Unless there is a radical change in the situation, the inquiry for tonnage will be confined to the occasional necessity of a shipper to save storage.

"Coal is arriving very slowly. None of the companies seem to be as well stocked as in 1898."

An American firm, the Haslam Foundry & Engineering Co. of New York City, won out against several British competitors and secured the contract for the installation of the refrigerating machinery for Queen Victoria's private yacht, the Victoria and Albert, launched at Pembroke dock yard a short time ago. The contract calls for two special machines of the vertical type with three cranks, one being coupled to the engine, another to the air compressor and the third to the air expansion cylinder.

## FORCED DRAFT FANS.

The necessity of forced draft for the development of high speed in steam yachts has led to many novel designs in the way of the fans required for producing draft. Such is the case presented in the accompanying illustration. This fan was installed on board a well known steam yacht, and supported close up to the skin of the boat and to the deck



above. Instead of delivering the air from an outlet in the periphery, a special internal deflector was introduced, and the outlet placed upon the side of the fan casing, so that the air was discharged into a duct running fore and aft.

The fan is driven by a direct-connected, double-cylindrical upright engine, which is entirely enclosed, and provided with continuous oiling devices, so as to require a minimum of attention while operating at the maximum speed. Channel irons serve to support the engine and the fan, and the entire apparatus occupies as little space as is possible for the given capacity. This fan is one of many of unique design built during the past few years by the B. F. Sturtevant Co. of Boston, Mass.

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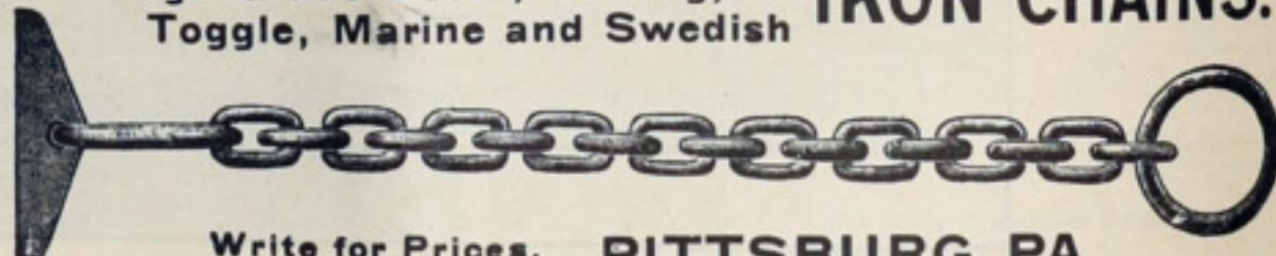
The total production of iron ore of all kinds in the United States in 1898, according to a report just completed by John Birkinbine of Philadelphia, special agent of the geological survey, was 19,278,369 gross tons. As the product of the Lake Superior ore region exceeded 14,000,000 long tons in 1898 it will be seen that the mines of the great lakes district are steadily increasing their proportion of the whole, which from the above statement is practically 75 per cent. The 1898 production is 1,730,323 long tons or 10 per cent. in excess of the previous maximum of 17,518,046 long tons produced in 1897 and over 1,225,000 tons above the record for Great Britain in 1880, when 18,026,049 long tons were mined. The ores of the British isles also average lower percentages of metal than those exploited in this country and therefore represent a smaller pig metal product.

The total output in long tons of all varieties by states was: Michigan, 7,346,846, Minnesota, 5,963,509, Alabama, 2,401,748, Pennsylvania, 773,082, Tennessee 593,227, Virginia 557,713, Wisconsin 509,645, Colorado 318,480, New Jersey 275,438, New York 179,951, Georgia and North Carolina 160,083, Montana, Nevada, New Mexico, Utah and Wyoming 55,969, Missouri 50,000, Ohio 42,868, Kentucky 12,913, Connecticut and Massachusetts 20,251, Texas 9,705, Maryland 5,941.

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## AROUND THE GREAT LAKES.

Marine men were shocked this week by the drowning of Capt. Julius De May of the tug Ruelle in Saginaw bay. Capt. De May was 61 years of age and had sailed on the lakes since he was 12 years of age.

Capt. George W. Moore of the United States revenue cutter service, on special duty at Chicago as inspector of the United States life saving service for the eleventh district, died some days ago at the Marine hospital. He was 62 years of age and entered the revenue cutter service in 1863.

Maj. Clinton B. Sears, United States engineer at Duluth, Minn., has opened bids for the repair of the breakwater at Ashland. Peter P. Ferguson of Ashland, was the lowest bidder, his figure being \$10,896. Other bidders were: H. Asseltine, Ashland, \$11,640; Hugo & Tims, Duluth, Minn., \$11,073; Belknap Bros., Ashland, Wis., \$14,820.

Assistant Engineer W. T. Blunt of the United States engineer steamer Visitor, forwards to the Review from Sandusky the following memorandum: "The three mast schooner James R. Benson, which was sunk on June 20 off the entrance to Sandusky harbor, lies on an even keel in 25 feet of water, 1,200 feet northwest of the range of Cedar Point lights, 2,000 feet north 11° east from the red lighted can at entrance, and 7,400 feet north 37° east from the Cedar Point beacon crib. The range of the lighted buoy and the main pavilion of the Cedar Point resort passes about 150 feet west of the wreck. While it is not in the channel, it is on the course of vessels coming in from the westward. It lies with its hull en-

tirely submerged, three masts still standing. The wrecking tug Mary Groh is now at work upon the schooner and expects to raise the whole intact by use of pontoons. The wreckers will keep a bright light upon the wreck from sunset to sunrise. Vessels entering Sandusky harbor should pick up the range while out in the lake so as to avoid any damage from the wreck."

About five years ago Mr. E. T. Chamberlain, United States commissioner of navigation, undertook a compilation of the laws of the United States relating to navigation and the merchant marine. The book, published in 1895, proved so convenient to the shipping interests for reference purposes, and especially in the offices of admiralty lawyers, who could get from it in a few minutes information requiring hours of labor over the statutes, that there was a great demand for it. Now the commissioner's office has issued a new edition, incorporating all legislation up to the close of the last congress. It is this kind of efficient work that has made Mr. Chamberlain so popular with the shipping interests.

The republic of Chili is wrestling with the problem of giving governmental aid to its shipping. Various solutions of the existent high shipping freights have been proposed, among which is a plan to make annually a subsidy allowance per registered ton for each 1,000 miles traversed; a scheme for granting privileges and reductions in duties to vessels flying the Chilean flag, and a suggestion for the establishment of a steamship line under the patronage of the state.

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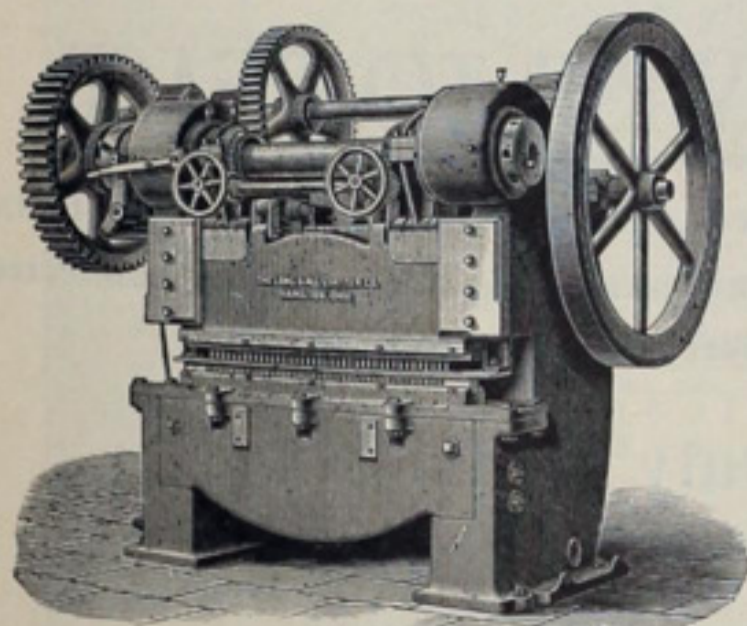
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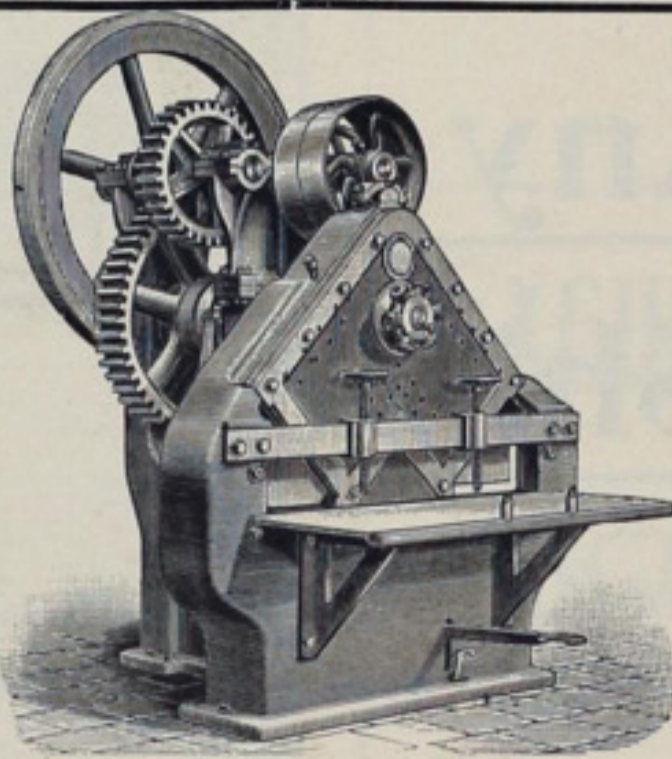
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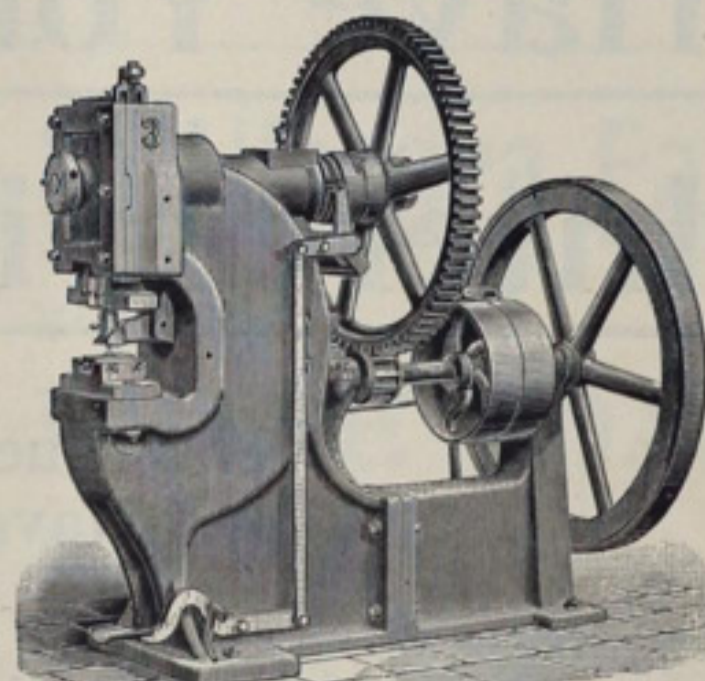


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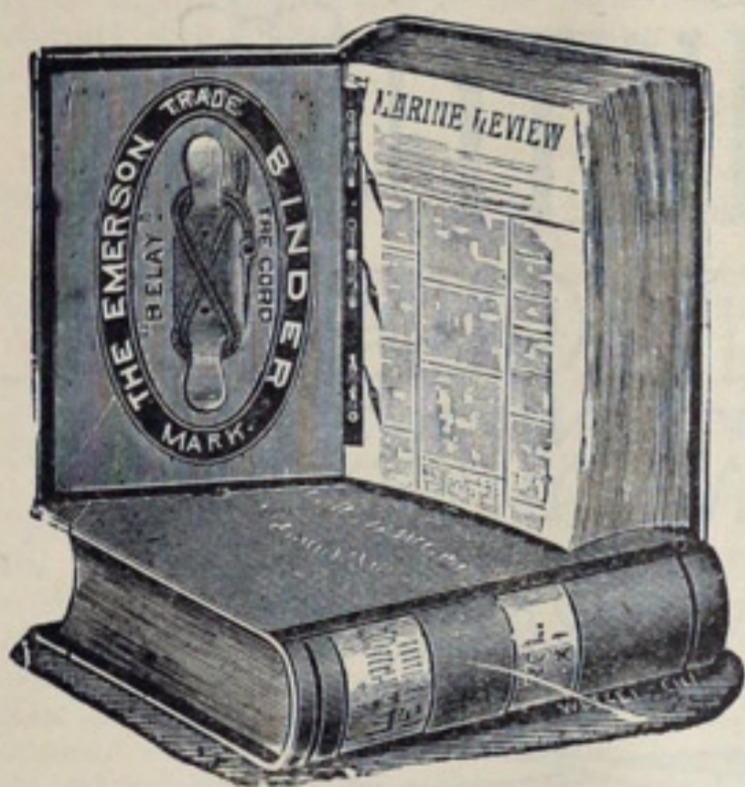
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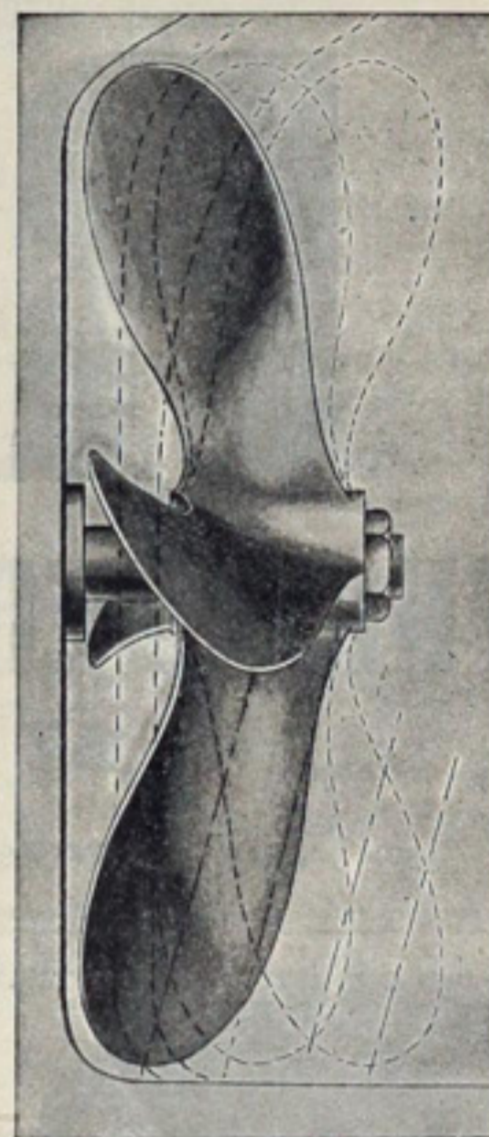
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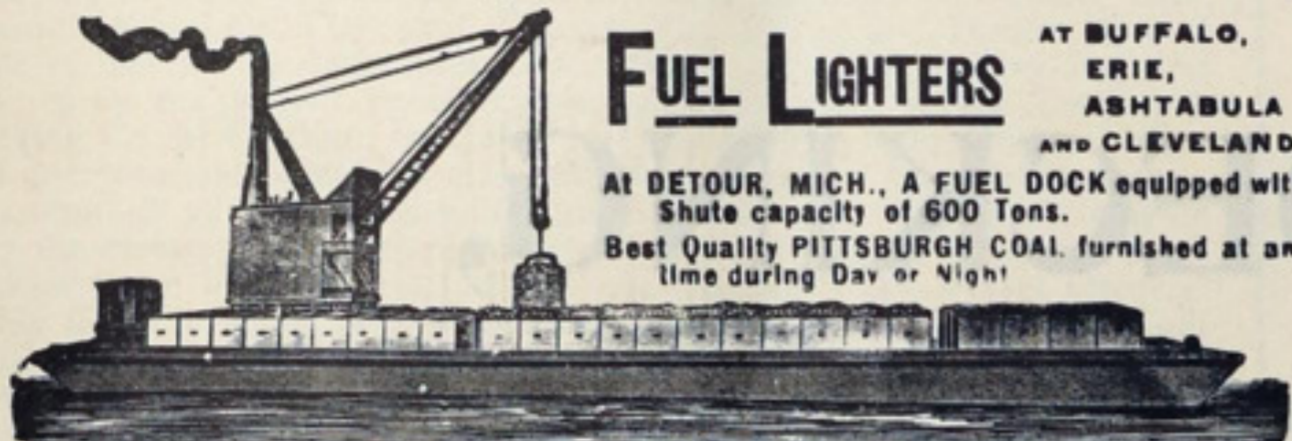
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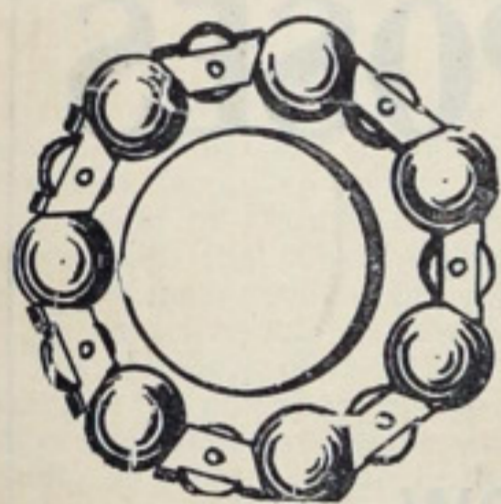
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Rapids, Mich., July 21, 1899. Sealed proposals for  
repairing government piers at Pentwater, Mich.,  
will be received here until 3 p. m., August 5, 1899,  
and then publicly opened. Information furnished  
on application. Chester Harding, Capt., Engrs.  
Aug. 3.U. S. Engineer Office, 57 Park St., Grand  
Rapids, Mich., July 14, 1899. Sealed proposals  
for Hydraulic Dredge will be received  
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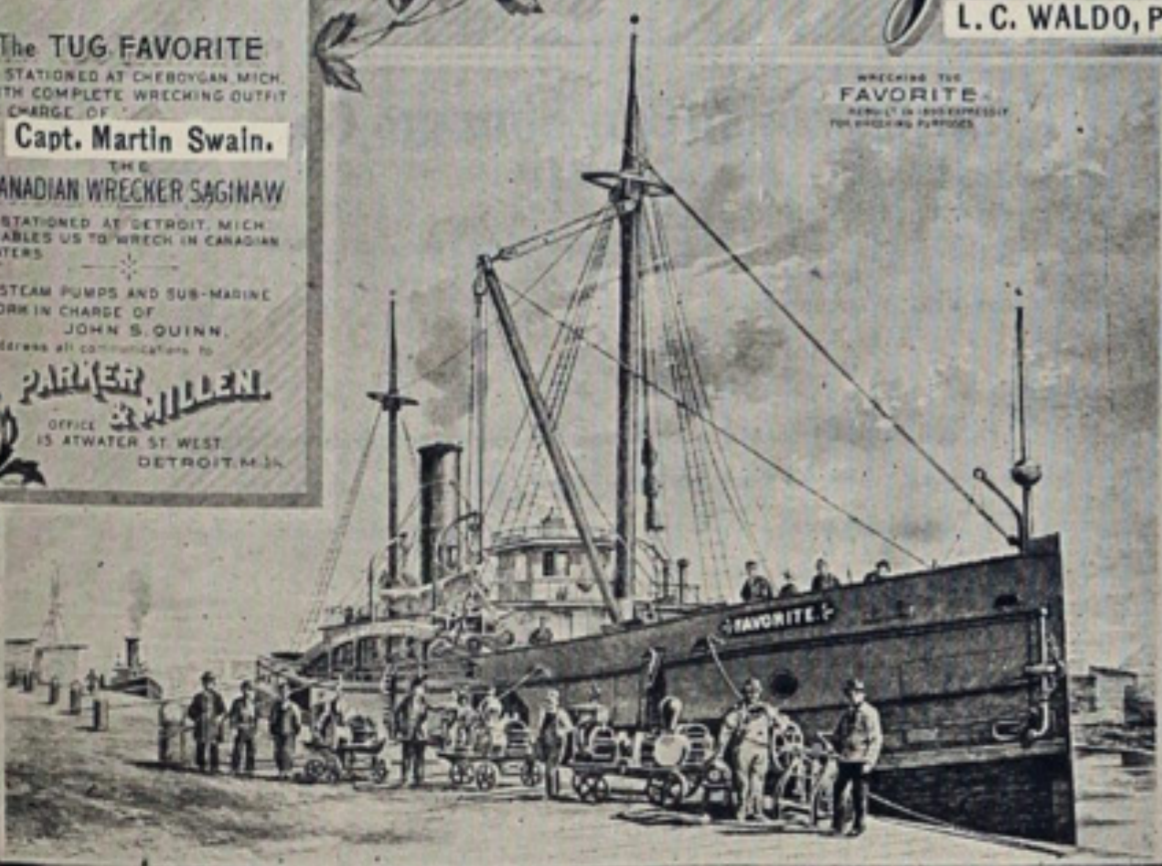
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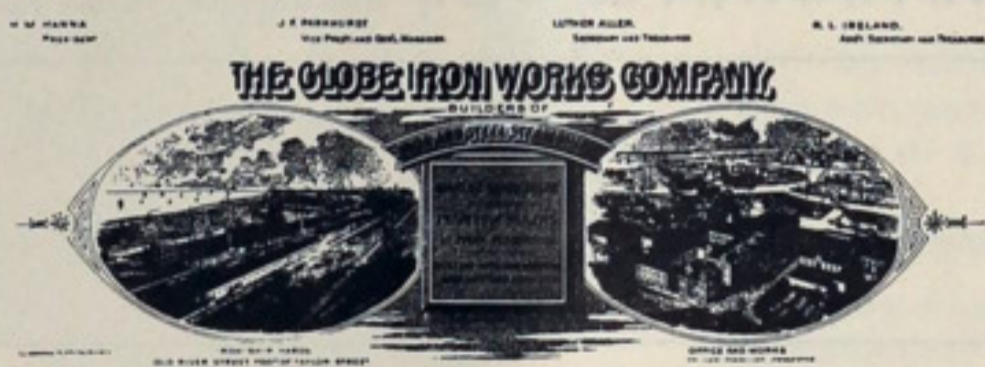
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